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# IRRIGATION



**J.S. & W.S. KUHN,**

INCORPORATED

**INVESTMENT BANKERS**

PITTSBURGH, PHILADELPHIA.

CHICAGO.

BANK FOR SAVINGS BUILDING

PITTSBURGH December 23d, 1909

Mr. J. C. Roell,

Librarian,

Berkeley, Cal.

Dear sir;

In accordance with your favor of December 17th, we are sending you under separate cover our Book on irrigation, which please accept with our compliments.

Yours very truly

*L. L. McCallister*<sup>4</sup>

Secretary & Treasurer.

# IRRIGATION

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BEING A BRIEF TREATISE COMPILED  
FROM AUTHORITATIVE SOURCES AND CON-  
TAINING THE FULL TEXT OF THE  
"CAREY ACT."

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Twin Falls in Snake River, 157 feet high.



## NOTE.

THE purpose of this book is to familiarize its readers with "Irrigation"—its meaning, and its bearing on the National prosperity—through a brief, and at the same time, comprehensive presentation of the subject.

An effort has been made to convey a clear appreciation of what it accomplishes—the enormous possibilities of its contribution to the wealth of the Nation—the opportunities offered by it, to the conservative investor, for the employment of capital, in large or small amounts, under the strong safeguards established by the Government.

The book may be divided into three parts.

- I. An academic treatment of the subject of Irrigation.
- II. An illustration of one of its conspicuous undertakings.
- III. The participation afforded investors in reclaiming the arid lands.

The information contained herein has been compiled from official and authoritative sources, and due acknowledgment is made to those responsible for the data contained in the several reports of the United States Government Reclamation Service; the Idaho State Engineer, the State Board of Horticultural Inspection, the State Bureau of Immigration, Labor and Statistics; and to J. Warner Mills, Esq., author of "Mills' Irrigation Manual," D. W. Ross, Esq., Supervising Engineer, and C. J. Blanchard, Esq., Statistician of the Government Reclamation Service, and to Messrs. R. H. McCollum and Edw. T. Barber, of Idaho.





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"Transforming the vast tracts of desert waste into fertile fields."

*"Water is the mother of the vine,  
The nurse and fountain of fecundity,  
The adorning and refresher of the world."*

*Chas. Mackay—The Dionysia.*

*Of all the Wonders of the World, who shall say that any one is conspicuous, in magnitude or marvel, beside those colossal undertakings of modern times—transforming the vast tracts of desert waste, into fertile fields, prolific with crops beyond belief!*

*Or, in the history of man's work, what progress is more noteworthy than that which has made possible "two blades of grass to grow on the same spot of earth where only one grew before," and has converted more than 1,000,000 square miles of desolate plains into a dozen commonwealths of 25,000,000 inhabitants!*

*The Government at Washington is shouting the slogan "Irrigation," to advance the Nation's standards of wealth and power, and the farmer with his toil, and the capitalist with his gold, are taking up the cry, as they realize that the development of the latent resources of the country, in the reclamation of its arid lands, will keep it the foremost Nation of the earth for centuries to come.*

*What then might be this magic "Irrigation," which finds today the wide extending plains, and gently sloping plateaus, mottled with the cancerous sage brush, neglected and deserted, except by the jackrabbit and howling coyote, and tomorrow presents to the world, for admiration, luxurious farms, rich in their waving grasses and heavy laden grain fields, and orchards, brilliant with the variegated hues of ripening clustered fruits?*





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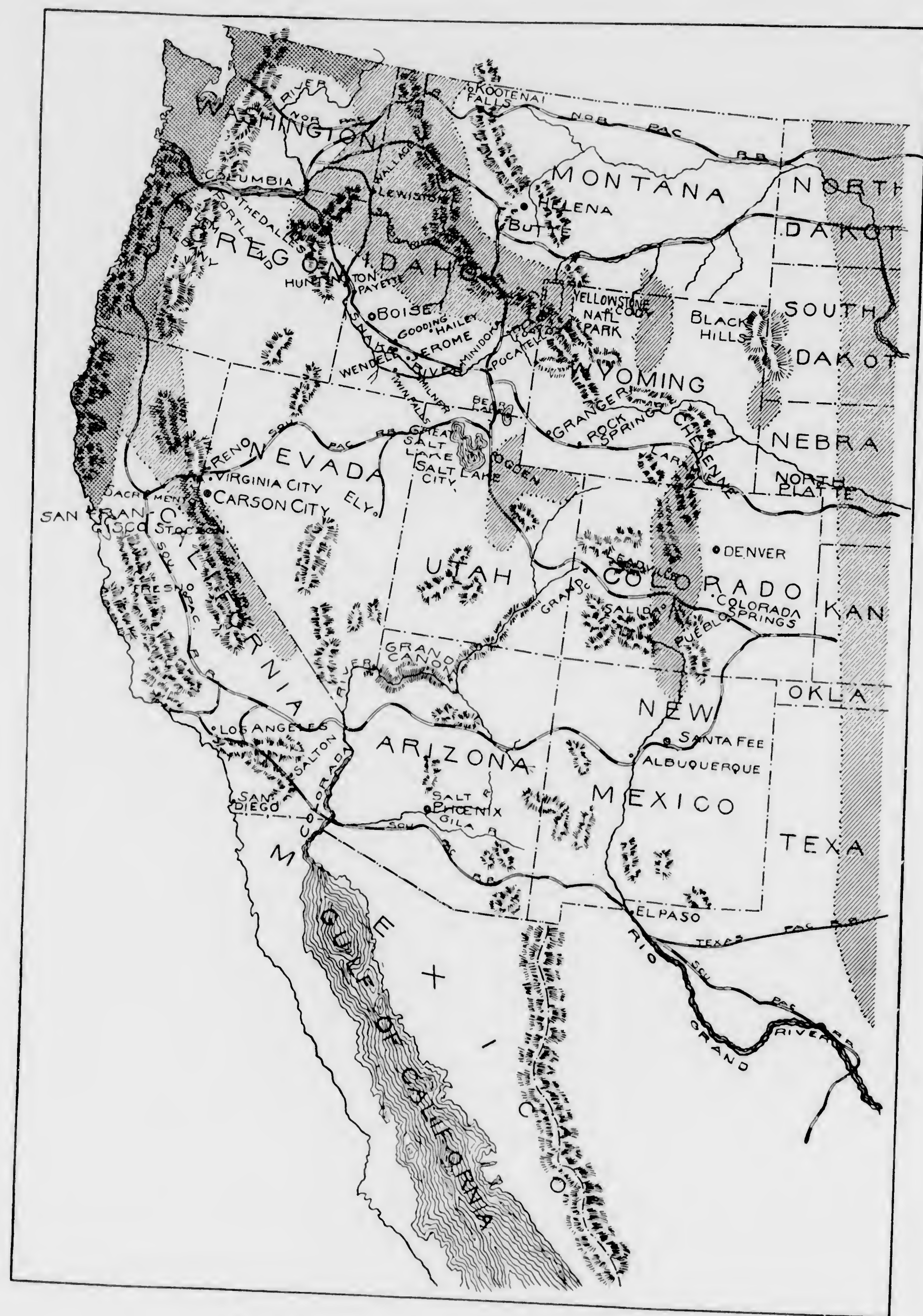
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Arid Lands of the United States.  
(The shaded portions indicate semi-arid and humid tracts.)

## Arid Lands of the United States.

### Aridity and its causes.

Aridity, or the unequal distribution of moisture, is largely the result of topography, or inequalities of land surface. The general movement of the atmosphere in this country is from West to East. The prevailing winds from the Pacific, warmed by the Japan current, and filled with moisture, soon reaching the mountain ranges paralleling the coast, are forced upward, and condensed by the rapid cooling of the higher altitudes. Their moisture, precipitated on the mountains, they pass Eastward as dry winds, denying the thirsty plains and lowlands the moisture they formerly held, and with which they so extravagantly parted.

### Lands Grouped.

The lands of the United States may be divided into three groups, differentiated by relatively decreasing rainfall, as "Humid," "Semi-arid" and "Arid."

In the first group are all of the states east of the Mississippi River, and those bordering it on the West, together with the Western portions of Oregon and Washington.

The Semi-arid group includes the greater portions of the Dakotas, Nebraska, Kansas, Oklahoma and Texas, Central Colorado, Northern Idaho and the Eastern part of California and Washington.

The Arid region—that wherein the average annual rainfall is 20 inches or less, and where the rainfall during the growing season is insufficient for raising crops—covers Montana, Wyoming, Colorado, Utah, Nevada, Arizona, New Mexico, Western Texas, Eastern Oregon and the Southern portions of California and Idaho.

This region embraces *two-fifths of the entire area of the United States*, in view of which, little wonder attaches to the importance of its reclamation, as a vital contributor to the wealth and future prosperity of the Nation.





"The same land when watered and put in alfalfa will feed twelve cows."

#### Soil of Arid lands.

The arid lands actually desert are comparatively few, but the scanty vegetation on the balance is of little value. The soils, however, are rich in mineral ingredients. The soluble salts are not washed out by rain, as they have been in the humid regions, but as stimulating chemicals have been accumulated and retained. These soils are also usually of the same quality to great depths, and plant roots penetrate more deeply. finding good feeding area and ability to resist drought. The rainfall farmer is obliged to resort to the "rotation of crops" and "fertilizers" to maintain the productiveness of his soil, but where arid lands have been farmed for forty years, there has been no perceptible diminution in the quality or quantity of crops, proving conclusively the stability of the richness of soil.

Mr. F. H. Newell, the chief engineer of the Government Reclamation Service, in one of his earlier reports says: "The open range of the arid region is capable of supporting one cow to every twenty or thirty acres, the same land when watered and put in alfalfa will feed twelve cows to every twenty acres, or in orchard, in favorable altitudes, will support a family of from three to five persons. An enormous enhancement in land values therefore attaches to the reclamation of these arid tracts; as an open range its value may be 50 cents per acre, while under irrigation the selling price may be from \$50 to \$1,000 per acre.

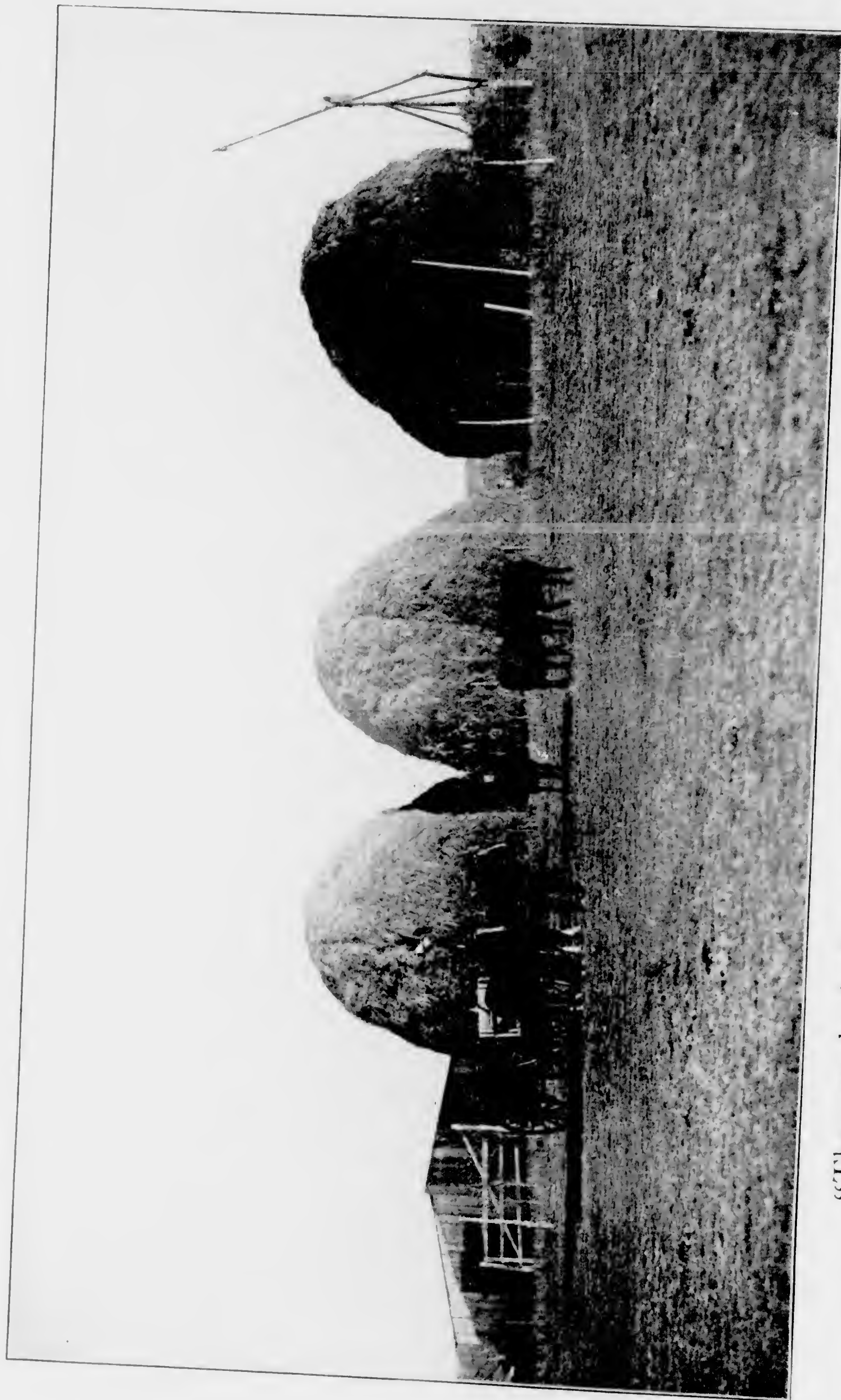
"One of the great economic questions now before the people of the country is the utilization of this vast area whose soil is so rich.

#### Public Lands.

"The Public Lands embrace nearly one-third of the entire extent of the United States, and are widely scattered, extending from the Gulf of Mexico to the Pacific, and from Canada to Mexico, and of these it may be said, that practically all of the land now remaining in the hands of the Government is arid."

Long since were the available public lands of the humid and semi-arid states absorbed by the rapidly increasing population, and pioneers set out on the arid lands to endeavor, by artificially produced moisture, to raise remunerative crops. These pioneers quickly demonstrated the immense superiority





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"The coveted prize of the progressive farmer."  
(Irrigated land on the Twin Falls tract in Southern Idaho.)

of the arid lands over the humid lands, in the greater productiveness of richer soil, when stimulated by regulated moisture and abundant sunshine. And so, instead of the arid lands remaining the last resort of a crowded community seeking cheaper lands, they became, wherever susceptible of individual irrigation, the coveted prize of the progressive farmer who set out to locate them.

#### Obstacles to Reclamation of Arid Lands.

Of the arid lands, however, not all are vacant, many of them having passed into the hands of private individuals or corporations, including land grants to railroads for the purpose of aiding construction, or those donated to States for various purposes, or again, those upon which homesteads and other entries have been made, along the banks of the rivers and about springs and other sources of water supply. The problem of reclamation is, therefore, not simply one dealing with public land, but is complicated by private ownership. Much of the arid land, too, cannot be reclaimed for physical reasons, which include unsuitable topography, lack of proper water supply, or soil and climate not adapted to agricultural pursuits. And so it is that the lands which are actually irrigable are relatively small in extent, there being probably not over 5% of arable land, in any one state, which can be irrigated.



Dairy Cows in Idaho.





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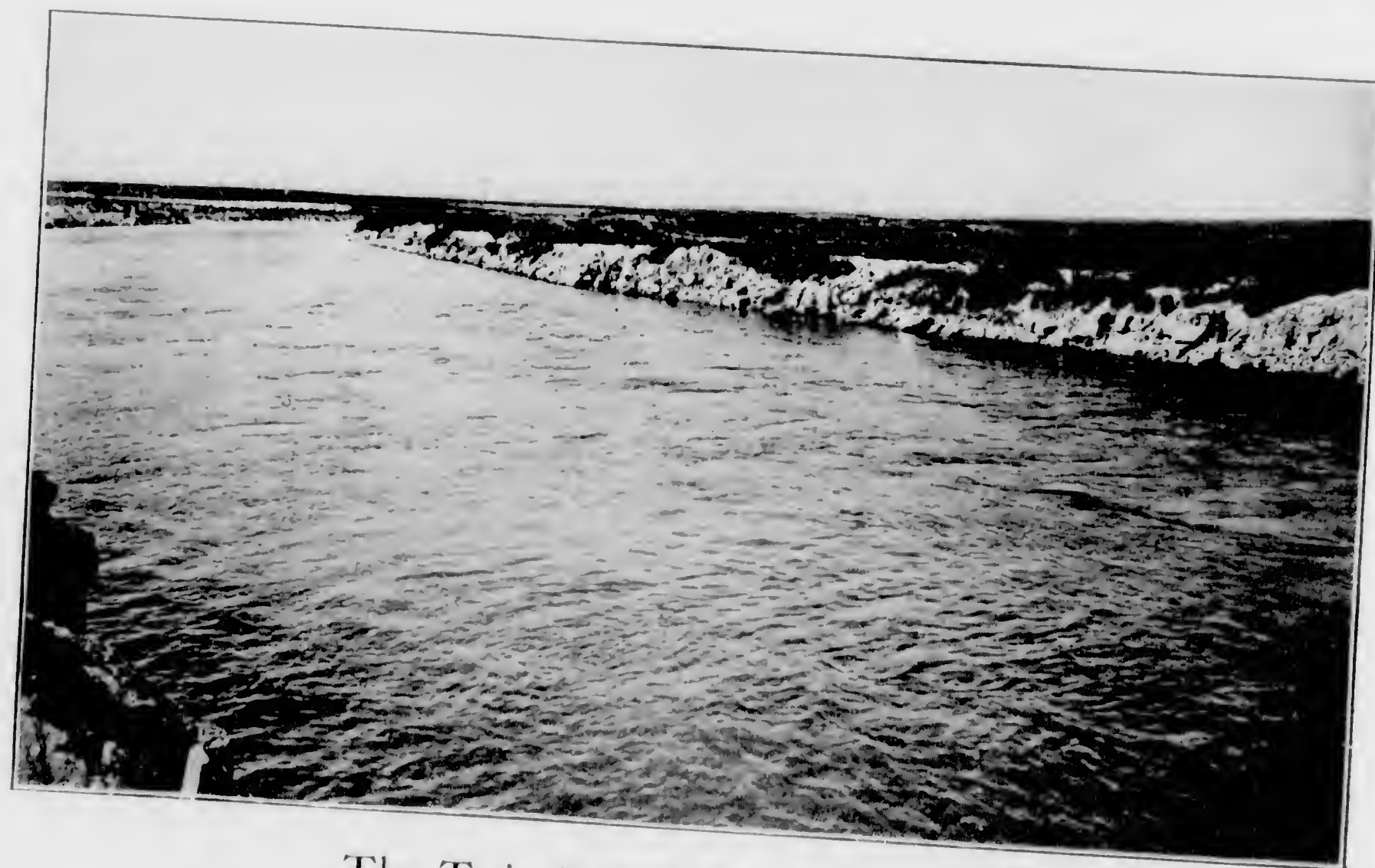


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"Permitting the water  
to course through  
the furrows."



The Twin Falls Main Line Canal.

## "Irrigation."

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The term "Irrigation," as here treated, refers to the application of moisture to land by artificial means, for the purpose of fertilizing land, and stimulating the growth of crops thereon. It may be briefly explained as the permanent diversion of water from rivers, lakes and other sources of supply, and its subsequent conveyance over tracts of land, by means of canals and ditches of gradually diminishing size, until, through miniature ditches or furrows—perhaps but a foot or two apart—it serves to fertilize the soil with which it is brought in contact.

The ideal engineering conditions in irrigation projects involve, initially, a natural lake, at an altitude, considerably above that of the lands to be irrigated, or a river whose flow is dependable, and whose fall and that of the land, is sufficient to permit of the conveyance of the diverted water through canals,

**Physical  
features of  
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by gravity, over the entire contemplated area, together with natural reservoir sites, for the storage of water to supplement the river's flow in times of unusual drought, and as a safeguard against any contingency which might arise. The diversion from the river may be accomplished by means of dams, those of more recent construction being of rock and concrete, raising the river to a proper height, and provided with numerous gates for the proper regulation of the flow.

The main canals, to be of permanency, are constructed of rock, earth and concrete, as are also the laterals, leading off from the main canals, to the ditches, which carry the supply to the individual farms, upon which the flow is regulated, by means of frequent headgates, permitting, thereby the water to course through the furrows, made by the farmer according to his needs, or enabling him to irrigate his land by flooding it.

The process of irrigation by no means contemplates a continuous flow of water, but involves a thorough moistening of the soil, perhaps but three or four times during the growing





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## DEVELOPMENT OF AN IRRIGATED FARM.



I  
The arrival of the Settler.



II  
Clearing off Sage Brush.

season, according to the character of the crops, and then requiring the water to be "turned on," but for twelve or twenty-four hours at a time.

**Irrigation Ancient.** Irrigation is not a modern art; its successful history dates back to the most ancient times. Ample evidences are found through the oldest historians, of its practice on a large scale by the Egyptians, from the days of the Pharaohs, by the Assyrians, Babylonians and Persians, and by the ancient Chinese. The engineering feats, apparent in the cataracts of the Nile, conclusively indicate their object for irrigation and navigation, while India possesses canals and aqueducts, still wonders of engineering skill.

That the wonderful results of Irrigation were in ancient times relatively what they are today, may be inferred from the attitude of Herodotus, the Greek historian, who, after returning from his trip to Egypt about 450 B. C., withheld the whole truth concerning the immense crops he found there, fearing to risk his discredit in the eyes of his countrymen.

It is also interesting to note that laws, written centuries before the time of Moses, carefully treated the various details of Irrigation. Mr. J. Warner Mills, in his "Irrigation Manual," quotes one of these laws as follows: "Any one failing to keep his irrigating dam in repair, and through his neglect and laziness, a break occurs in the dam, and his neighbors' lands are flooded by the overflow of the water therefrom, he shall compensate the owner of the damaged land for his loss of grain or other property occasioned by the overflow."

In later years, but still within the early history of the Roman Empire, Irrigation laws had their liberal consideration.

**Irrigation on the Western Continent.** The Incas of South America have contributed many evidences of their knowledge of the art, and the traces of long since ruined works in Central America, Mexico and even in Arizona, show its elaborate development, by a prehistoric people on this continent before, in more modern times, the establishment of the Jesuit missions in California, a century back, resurrected the utilization of the old canals and reservoirs constructed by the early Indians.



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III

Same land cleared of Sage Brush.



IV

Same land four months later.

## Some "Irrigation" Legal Features.

The enactment of National Irrigation law has its foundation in a combination of the laws relating to water, and the laws relating to land; the working of the water laws of the several States being responsible for the provisions embodied in the former, and the latter comprising a development of the several Federal laws governing the settlement of public lands.

### Development of Irrigation Laws.

To follow the development of laws pertaining to water—those relating to riparian rights, appropriations, priority, and the general adjudication of water rights,—would be a long story. It is sufficient to mention, that as a general principle, in all of the arid states, the doctrine of appropriation prevails, as against the common law doctrine of riparian rights, and that, because of its necessity, "water in the various streams thus acquires a value unknown in moister climates. Instead of being a mere incident to the soil, it rises, when appropriated, to the dignity of a distinct usufructuary estate or right of property."

### Water appurtenant to the land in arid states.

To quote from the report of the State Engineer of Idaho, "throughout a very large proportion of our state, land titles would mean absolutely nothing in the absence of water titles, and water titles are of little force and validity, unless the state, through its duly authorized officers, sees to it that these titles are made forceful and valid."

The constitution of the State of Idaho specifically denies the private ownership of water, and dedicates it to the public use, under laws and regulations governing its appropriation.

The Desert Land Act and the Homestead Law mark stages of development, leading to the Federal statute known as the "Reclamation Act," (under which arid lands are reclaimed by the Government,) and the "Carey Act," which has made possible the reclamation of large tracts, through the employment of individual and corporate capital.





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**Desert Land Act.**

*The Desert Land Act*, passed in 1877, provides that any citizen of the United States, by paying 25 cents per acre, may file on desert land in certain states and territories, not exceeding 640 acres, and having reclaimed the land filed upon, within three years, upon the additional payment of \$1.00 per acre a patent for the land shall be issued to him. The Act was amended in 1891, requiring plans to be filed at the time of application, the expenditure of not less than \$1.00 per acre annually on irrigation, etc., for three consecutive years, and the actual cultivation of one-eighth of the acreage, or the expenditure of not less than \$1.00 per acre annually for four consecutive years on irrigating, etc., before a patent shall issue. Failure to make the expenditures as stipulated, renders the entry subject to cancellation and forfeiture of all rights. The amendment also limits the holdings of any one individual to 320 acres. Under the provisions of this Act, however, two or more persons may associate themselves together and jointly improve the land.

*The Homestead Law* enacted in 1872, provides that any citizen, not owning over 160 acres in any state or territory, may enter upon, settle, and acquire title to not exceeding 160 acres of public land, by establishing and maintaining residence thereon, and improving and cultivating the land for the continuous period of five years. This law amended provides that, upon fourteen months fulfillment of the conditions, a patent may issue upon payment of \$1.25 per acre. This amendment is referred to as the "commutation" feature of the Act.

**Reclamation Law.**

*The Reclamation Law*, under which the Government is now operating, in the reclamation of arid lands, was passed in 1902. Provision was made for the examination, survey and construction of irrigation works, required to reclaim public lands, and for this purpose there were appropriated the receipts from the sale and disposal of public land in sixteen states and territories of the arid region. These receipts constitute what is known as the "Reclamation Fund." The Act provides for the entry of the lands reclaimed, in accordance with the provisions of the

"Homestead Law," which is modified in certain important particulars—among them the following: The entryman must repay, in annual installments, to the Reclamation Fund, the cost of constructing the works necessary to reclaim the land he has taken; the time of residence cannot be commuted, as by the amendment to that law, involving therefore residence on the land for the entire five years, as well as an additional requirement that one-half of the land must be cultivated. The area of the entry is also limited to an amount not less than forty nor more than 160 acres at the discretion of the Secretary of the Interior. Upon the payment for the major portion of the lands irrigated, the management and operation of the works shall pass to the owners of the lands irrigated thereby, under certain further provisions of the Government. Failure on the part of the entryman under this Act, to make any two consecutive payments when due, shall render the entry subject to cancellation with the forfeiture of all rights under this Act, as well as any moneys paid thereon.



V  
Wheat yields as high as  $84\frac{1}{2}$  bushels per acre.



**Desert Land Act.**

*The Desert Land Act*, passed in 1877, provides that any citizen of the United States, by paying 25 cents per acre, may file on desert land in certain states and territories, not exceeding 640 acres, and having reclaimed the land filed upon, within three years, upon the additional payment of \$1.00 per acre a patent for the land shall be issued to him. The Act was amended in 1891, requiring plans to be filed at the time of application, the expenditure of not less than \$1.00 per acre annually on irrigation, etc., for three consecutive years, and the actual cultivation of one-eighth of the acreage, or the expenditure of not less than \$1.00 per acre annually for four consecutive years on irrigating, etc., before a patent shall issue. Failure to make the expenditures as stipulated, renders the entry subject to cancellation and forfeiture of all rights. The amendment also limits the holdings of any one individual to 320 acres. Under the provisions of this Act, however, two or more persons may associate themselves together and jointly improve the land.

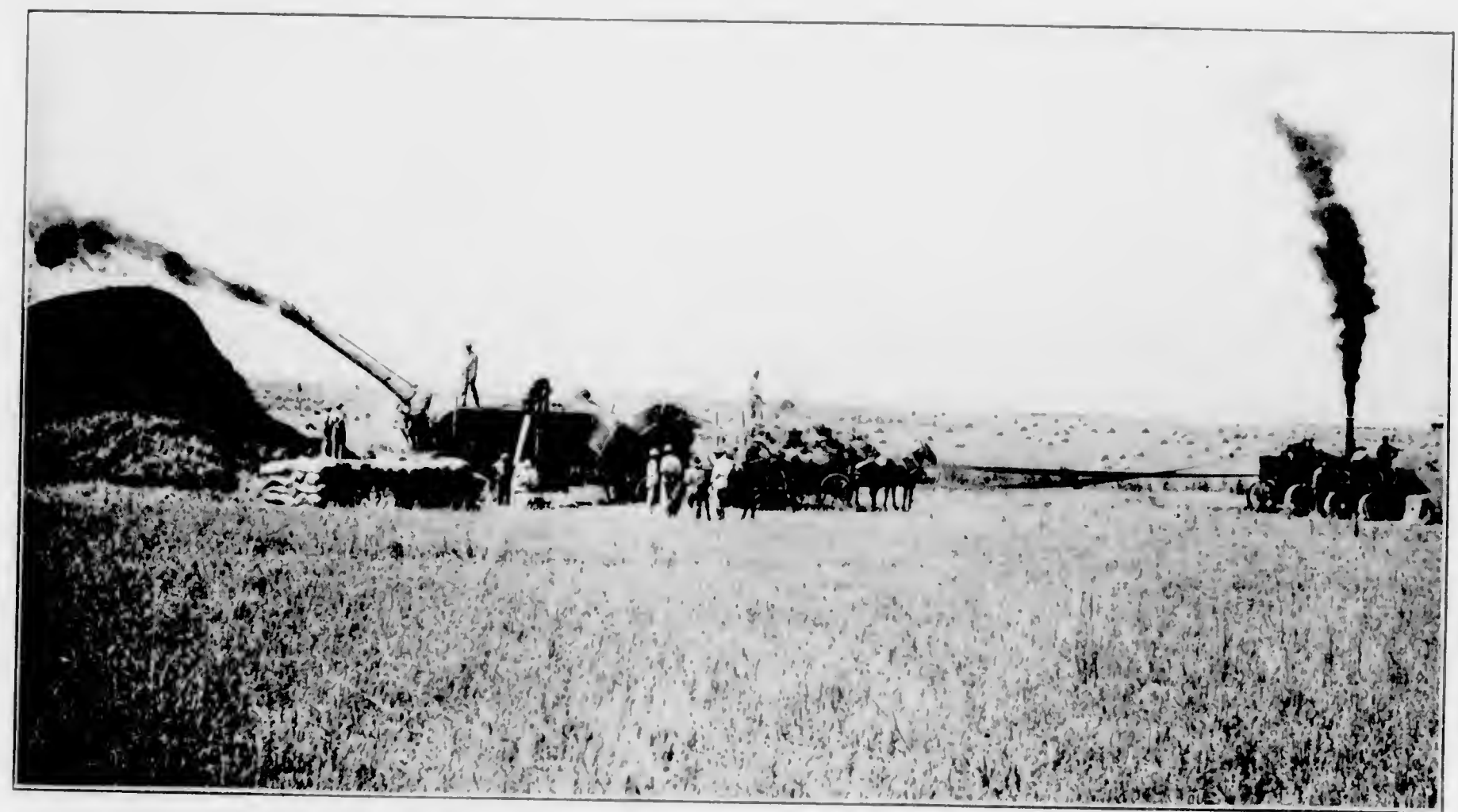
*The Homestead Law* enacted in 1872, provides that any citizen, not owning over 160 acres in any state or territory, may enter upon, settle, and acquire title to not exceeding 160 acres of public land, by establishing and maintaining residence thereon, and improving and cultivating the land for the continuous period of five years. This law amended provides that, upon fourteen months fulfillment of the conditions, a patent may issue upon payment of \$1.25 per acre. This amendment is referred to as the "commutation" feature of the Act.

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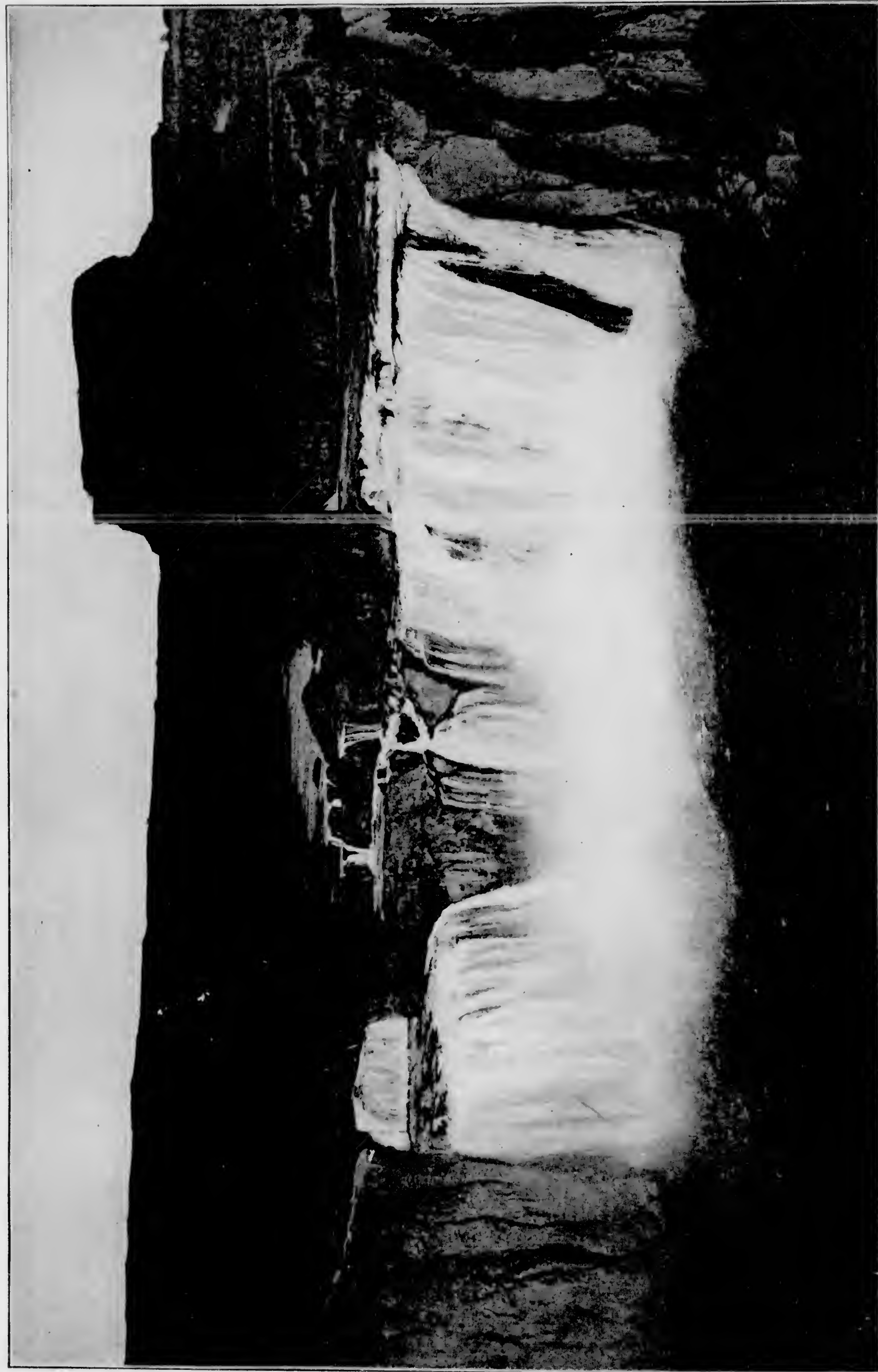
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Great Shoshone Falls in the Canyon of the Snake. Drop 210 feet, 55 feet higher than Niagara.

## The Carey Act.

By far the ablest Irrigation legislation, and that most far-reaching in its effects, calculated, at the same time to encourage the investment of private capital, by securing its repay-

### Carey Act Comprehensive and Just.

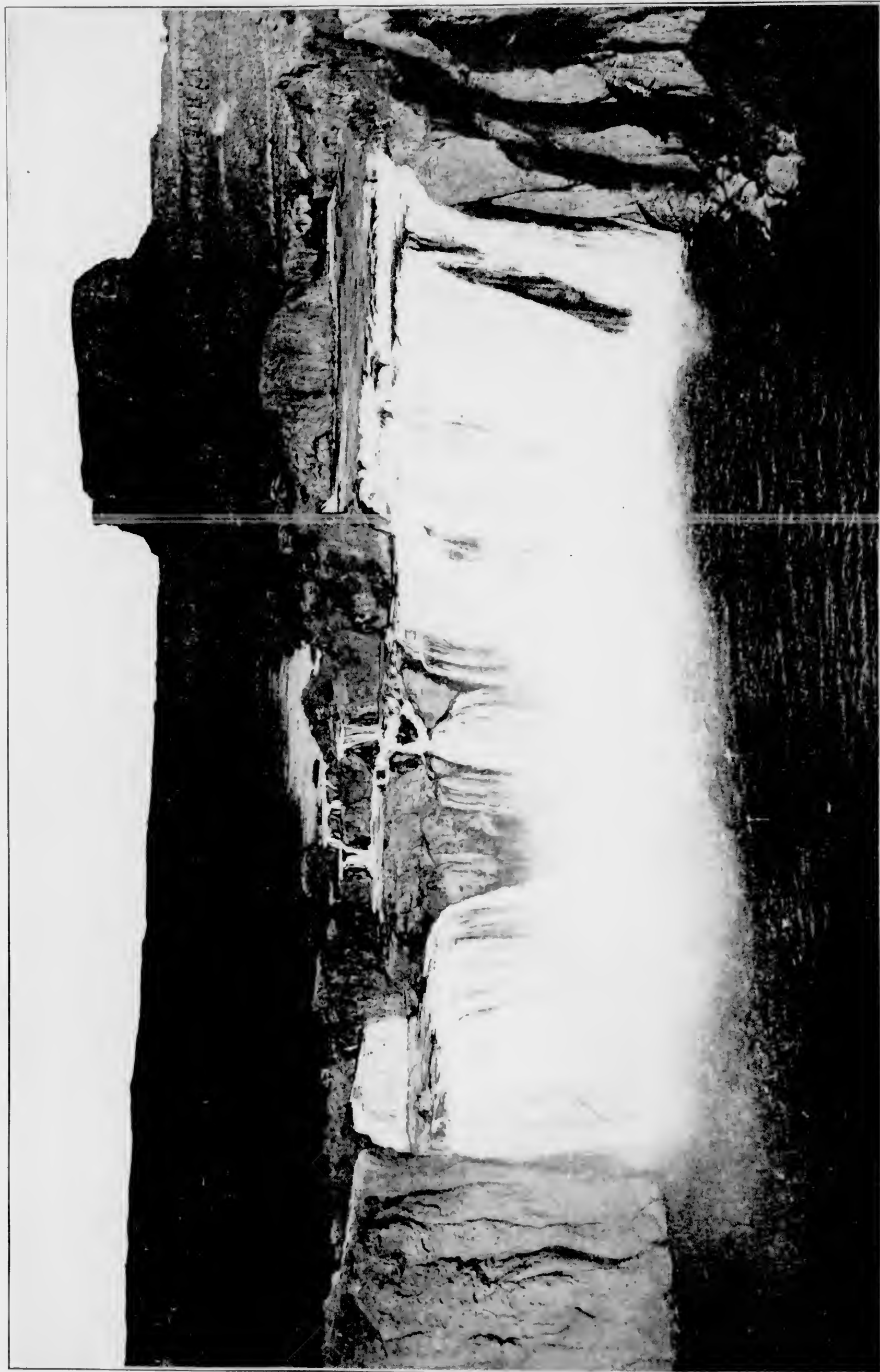
ment, after providing for a liberal compensation, and to attract settlers, through affording them full protection against pernicious speculative, or ineffectual "schemes," and by vesting them, eventually, with the proprietorship of the Irrigation system, upon payment therefor at a fair value on easy terms, is the Federal Statute, known as the "Carey Act."

This Act, for which Senator Carey of Wyoming was sponsor, originally passed in 1894, and twice amended, stands today the culmination of laws, evolved after an experience of forty years, under whose just and comprehensive provisions, the reclamation of all the remaining irrigable lands bids fair to be secured, as soon as capital shall receive the proper presentation and the progressive farmer the word.

### Reasons for the "Carey Act."

This legislation was enacted by Congress, through its realization of the enormous wealth, hidden in the agricultural resources of the Public Lands—barren wastes of arid tracts, though they might appear. The work of reclamation, under the then existing laws, was too gigantic for individual or corporate capital, and attended with too great risk to warrant its hazard, and irrigation, on a large scale, was as yet too much in its infancy, to warrant the vast necessary expenditures by the Government. Rather than delay development, however, the plan was conceived for the Government to assist in this work, by donating 1,000,000 acres of Public Lands in each of the arid states, to the states themselves, in consideration of the irrigation and settlement of not less than 20 acres in each 160 reclaimed, whether at the hands of the respective commonwealth, or through contract with private corporations.





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**Workings of the  
"Carey Act."**

The act in detail works out as follows:

A certain tract of Government land having been determined upon as suitable for reclamation, the corporation desiring to construct irrigation works thereon, for the purpose of reclaiming the land under the act, files with the State Board of Land Commissioners its application, together with its proposal for constructing the works. This application must be accompanied with a detailed plan, covering the proposed works, including an estimate of the cost of construction, and showing the source of the water supply, and that filings for the water appropriation have been made, also the terms per acre at which the perpetual water rights will be sold to settlers. These plans must be approved by the State Board of Land Commissioners, and the water supply must be thoroughly examined and reported on by the State Engineer. The State then makes application, to the Secretary of the Interior, for a segregation of the lands embraced in the application, submitting the exact plans for the proposed system, and if after due consideration, the Secretary of the Interior complies with the request, the State Board enters into a contract with the corporation, covering the specifications, as set forth in the application, the corporation giving an adequate bond for the faithful performance of their part of the contract, and the work proceeding under the direct supervision of the State Engineer.

These safeguards as to the feasibility and effectiveness of the project, inure to the benefit of both the investor and the settler, preventing ill-advised undertakings on the part of the former, and affording the latter protection in the character and quality of the works, and in fixing a fair valuation to the cost of the individual water rights.

Under authorization of the United States Government, and upon the segregation of the lands to be irrigated, the state creates a first and prior lien in favor of the corporation, under which none of the land may be sold, until the purchaser has acquired from the corporation, at the stipulated price, corresponding water rights, or shares in the carrying capacity of the canals, sufficient to deliver the water required for the irrigation of his land. These water rights are purchased on terms

of a certain amount in cash down, and the balance in deferred payments, the settler giving his promissory notes therefor, secured by a first lien on the land until finally paid, these representing virtually purchase money mortgages. Patents from the State may only be issued when the settler shall have actually settled the land, and cultivated at least one-eighth of the acreage. The settlement must be accomplished within six months, and the cultivation completed within two years, after the water has been made available for irrigation. The land also may be sold only in divisions of not less than 40 nor more than 160 acres.

The strong security to the corporation for the return of its investment, will be noted in the above, since a first lien is created on all of the lands, which must be immediately cultivated and settled by a large body of individuals, thus dividing the responsibility for prompt payments and assuring an increased valuation to the land, such as naturally attaches to the lands of a settled community.

Through these provisions also, the speculative holdings of large tracts of land is prevented, and bona fide owners are obtained, each directly interested in the development of the land.

A further feature of the "Carey Act" vests the proprietorship of the irrigation works in the settlers, upon payment therefor to the corporation, who will have then received back the original investment, and the profit, as contemplated in the original application. The terms of transfer are usually stipulated in the contract between the State and the Corporation.

It is hard to conceive how a more comprehensive law could have been framed, just alike to the capitalist and to the settler, nor a plan more calculated to effect the results contemplated for it.

**Text of the  
"Carey Act."**

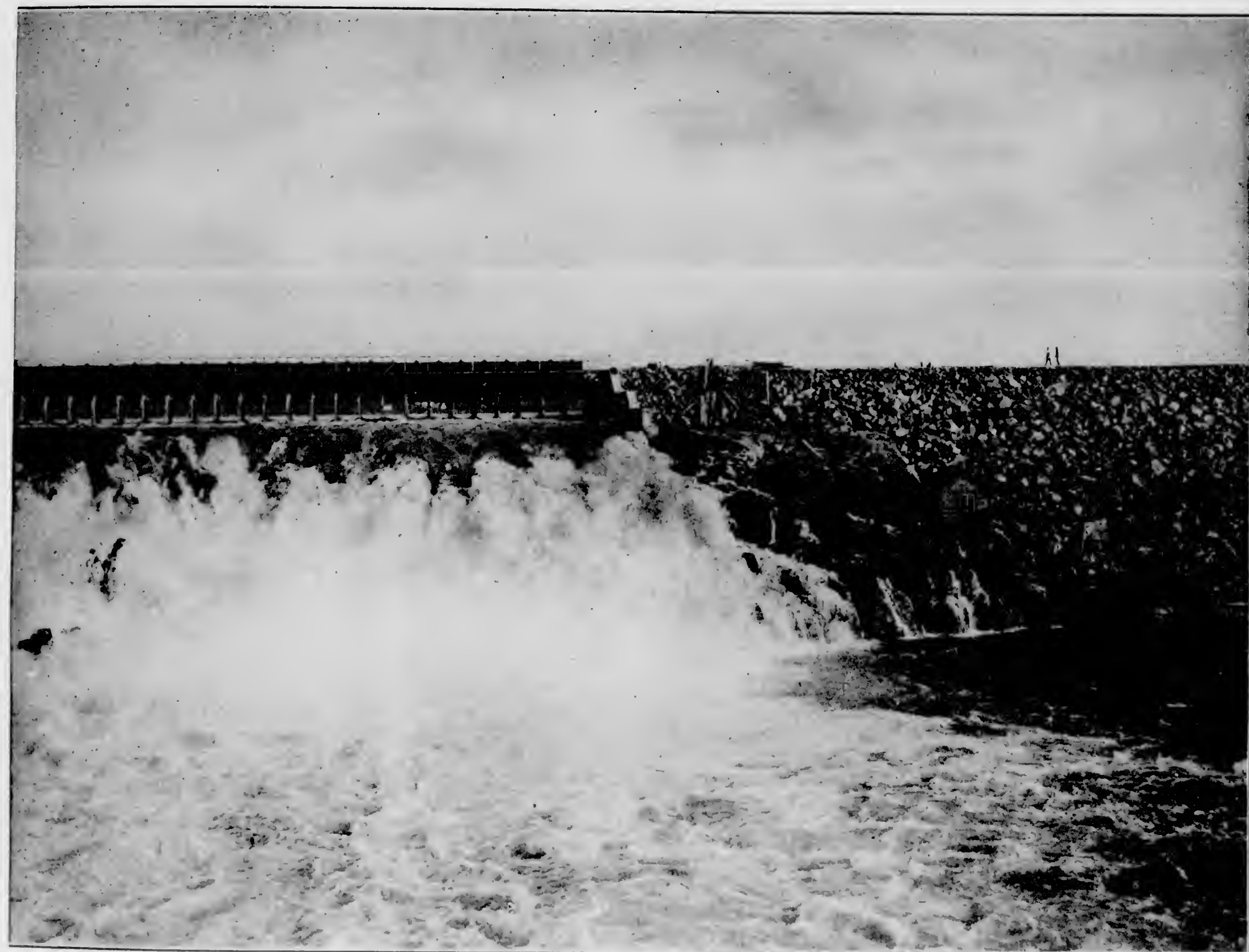
The following extract from the Rules and Regulations of the State Board of Land Commissioners of the State of Idaho, sets forth in full the "Carey Act," and its several amendments.

"Section 4 of the Act of Congress, approved August 18, 1894, entitled, 'An Act Making Appropriations for Sundry Civil Expenses of the Government for the Fiscal Year ending June 30, 1895, and for Other Purposes,' (28 Stat. 372-422) authorizes





THE GREAT DAM AT MILNER, IDAHO.

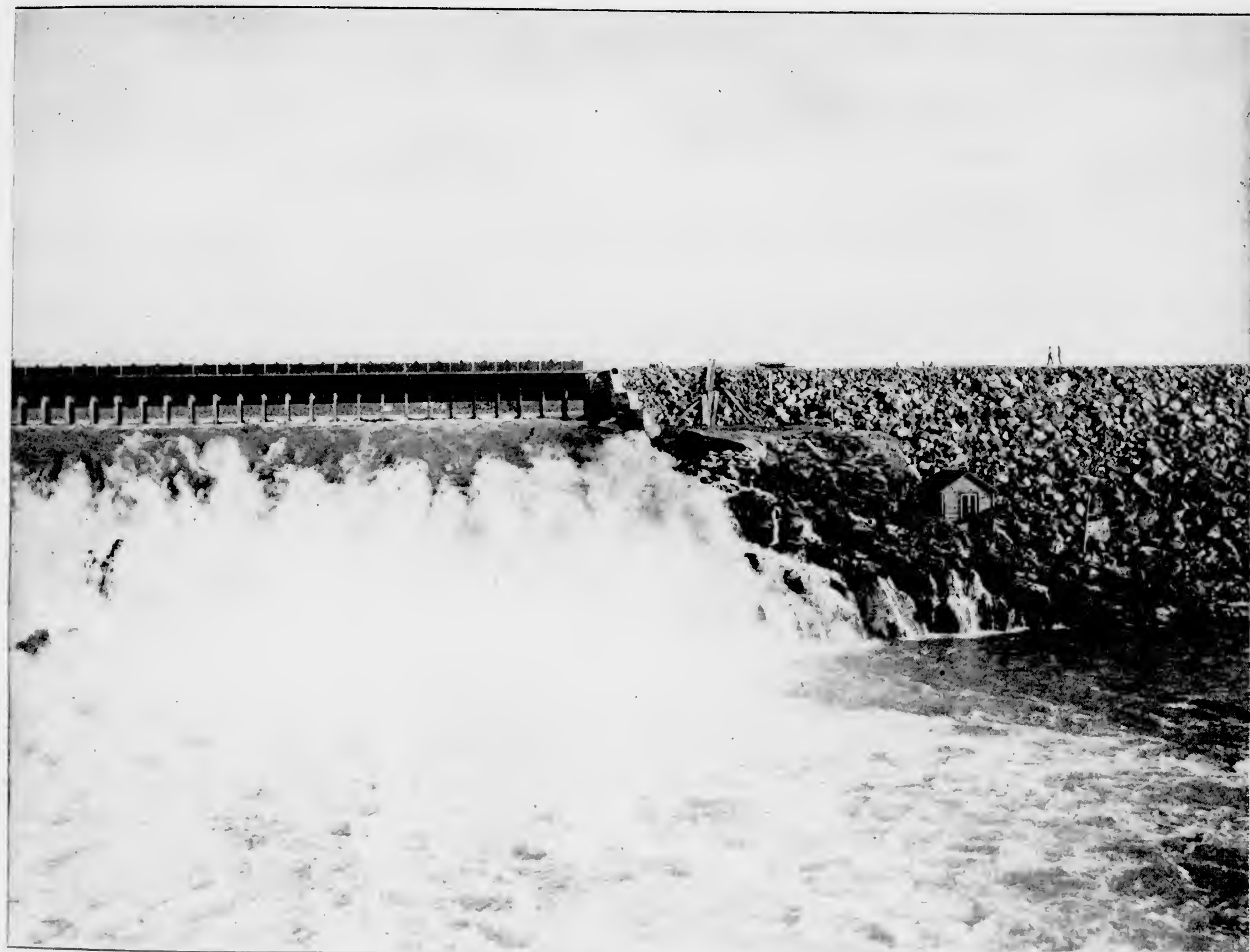


The gates extend 530 feet along the crest of the dam whose total length is 2000 feet.





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INTENTIONAL SECOND EXPOSURE



the Secretary of the Interior, with the approval of the President, to contract and agree to patent to the states of Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, North Dakota, South Dakota and Utah, or any other states, as provided in the act, in which may be found desert lands, not to exceed 1,000,000 acres of such lands to each state, under certain conditions.

The text of the act is as follows:

"That to aid the public land states in the reclamation of the desert lands therein and the settlement, cultivation and sale thereof, in small tracts to actual settlers, the Secretary of the Interior with the approval of the President, be, and hereby is, authorized and empowered, upon proper application of the state, to contract and agree, and from time to time in each of the states in which there may be situated desert lands, as defined by the act entitled 'An Act to Provide for the Sale of Desert Land in Certain States and Territories' approved March third, eighteen hundred and seventy-seven, and the act amendatory thereof, approved March third, eighteen hundred and ninety-one, binding the United States to donate, grant and patent to the state free of cost for survey or price such desert lands not exceeding one million acres in each state, as the state may cause to be irrigated, reclaimed, occupied, and not less than twenty acres of each one hundred and sixty acre tracts cultivated by actual settlers, within ten years next after the passage of this act, as thoroughly as is required of citizens who may enter under the desert land law.

"Before the application of any state is allowed, or any contracts or agreement is executed, or any segregation of any of the land is ordered by the Secretary of the Interior, the state shall file a map of the said land proposed to be irrigated, which shall exhibit a plan showing the mode of the contemplated irrigation and which plan shall be sufficient to thoroughly irrigate and reclaim said land and prepare it to raise ordinary agricultural crops, and shall also show the source of the water to be used for irrigation and reclamation, and the Secretary of the Interior may make necessary regulations for the reservation of the lands applied for by the states to date from the date of the filing of the map and plan of irrigation, but such reservation shall be of no force whatever if such map and plan of irrigation shall not be approved. That any state contracting under this section is hereby authorized to make all necessary contracts to cause the said lands to be reclaimed, and to induce their settlement and cultivation in accordance with and subject to the provisions of this section; but the states shall not be authorized to lease any of said lands or to use or dispose of the same in any way whatever, except to secure their reclamation, cultivation and settlement.

"As fast as any state may furnish satisfactory proof according to such rules and regulations as may be prescribed by the Secretary of the Interior, that any of said lands are irrigated, reclaimed and occupied by actual settlers, patents shall be issued to the state or its assigns for said lands so reclaimed and settled: Provided, that said states shall not sell or dispose of more than one hundred and sixty acres of said lands to any one person, and any surplus of money derived by any state from the sale of such lands in excess of the cost of their reclamation, shall be held as a trust fund for and be applied to the reclamation of other desert lands in such state. That to enable the Secretary of the Interior to examine any of the lands that may be selected under the provisions of this section, there is hereby appropriated out of any moneys in the treasury, not otherwise appropriated, one thousand dollars."

In the act making appropriations for sundry civil expenses of the government for the fiscal year ending June 30, 1897, and

for other purposes approved June 11, 1896, there is, under the head of appropriation for "surveying public lands," the following provisions:

"That under any law heretofore or hereafter enacted by any state, providing for the reclamation of arid lands, in pursuance and acceptance of the terms of the grant made in section four of an act entitled, 'An Act Making Appropriations for the Sundry Civil Expenses of the Government for the Fiscal Year Ending June Thirtieth, Eighteen Hundred and Ninety-five,' approved August eighteenth, eighteen hundred and ninety-four, a lien or liens is hereby authorized to be created by the state to which lands are granted and by no other authority whatever, and when created shall be valid on and against the separate legal subdivisions of land reclaimed for the actual cost and necessary expenses of reclamation and reasonable interest thereon from the date of reclamation until disposed of to actual settlers; and when an ample supply of water is actually furnished in a substantial ditch or canal, or by artesian wells or reservoirs, to reclaim a particular tract or tracts of such lands, then patent shall issue for the same to such state without regard to settlement or cultivation: Provided, that in no event, in no contingency and under no circumstances shall the United States be in any manner directly or indirectly liable for any amount of any such lien for liability in whole or in part."

The limitation of time in the above quoted section 4 was modified by section 3 of the Act entitled "An Act Making Appropriations for Sundry Civil Expenses of the Government for the Fiscal Year Ending June Thirtieth, Nineteen Hundred and Two, and for Other Purposes," approved March 3, 1901 (31 Stat., 1133-1188) which provides as follows:

"Sec. 3.—That section 4 of the act of August eighteenth, eighteen hundred and ninety-four, entitled, 'An Act Making Appropriations for Sundry Civil Expenses of the Government for the Fiscal Year ending June Thirtieth, 1885, and for other purposes,' is hereby amended so that the ten years' period in which any state shall cause the lands applied for under said act to be irrigated and reclaimed, as provided in said section as amended by the act of June eleventh, eighteen hundred and ninety-six, shall begin to run from the date of approval by the Secretary of the Interior of the state's application for the segregation of such lands: and if the state fails within the said ten years to cause the whole or any part of the lands so segregated to be so irrigated and reclaimed, the Secretary of the Interior may, in his discretion, restore such lands to the public domain."



Fattened on Alfalfa and Field Peas.



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Fattened on Alfalfa and Field Peas.





The Blue Lakes.  
The source of water supply for the pioneer irrigated farm of Southern Idaho.



## Development of Irrigation.

**Primitive Irrigation** The modern development of irrigation in the United States has its foundation in the gradual absorption of the public lands in the humid and semi-arid regions, half a century since. Then it was that the pioneer on the arid lands, locating his ranch near some source of water supply, with his own appliances, began to construct ditches leading from the mountain creeks, and by them irrigated his farm. His ingenuity and toil thus enabled him to secure crops on the lowlands along the rivers. Those who followed later on, found the lowlands along the small streams, preempted, and were obliged to establish their farms at greater distances from the streams, involving greater expense in conveying the necessary water.

**Co-operative Ditch Associations.** This led to the combination of farmers in jointly constructing main canals from the streams and rivers, and subsequently dividing among themselves the flow, and thus came into being the "co-operative ditch associations," and later the formation of "municipal irrigation districts."

**Irrigating Companies.** The demand for irrigation constantly growing, with the salutary results in evidence, was met by the organization of companies for the purpose of building ditches and reservoirs, and delivering water to users through rentals. These at first were on a small scale. As questions of law and equity arose and legislation was enacted, recognizing certain rights or establishing precedent, capital was encouraged by the gradually increasing protection afforded it, until such safeguards have since been established, that there are now in operation, large enterprises of private corporations, operating under the strong provisions of the Carey Act, and works of the Government, fostered under the Reclamation Act, which are gigantic in their engineering undertakings, and which involve the expenditure of millions of dollars in a single project.





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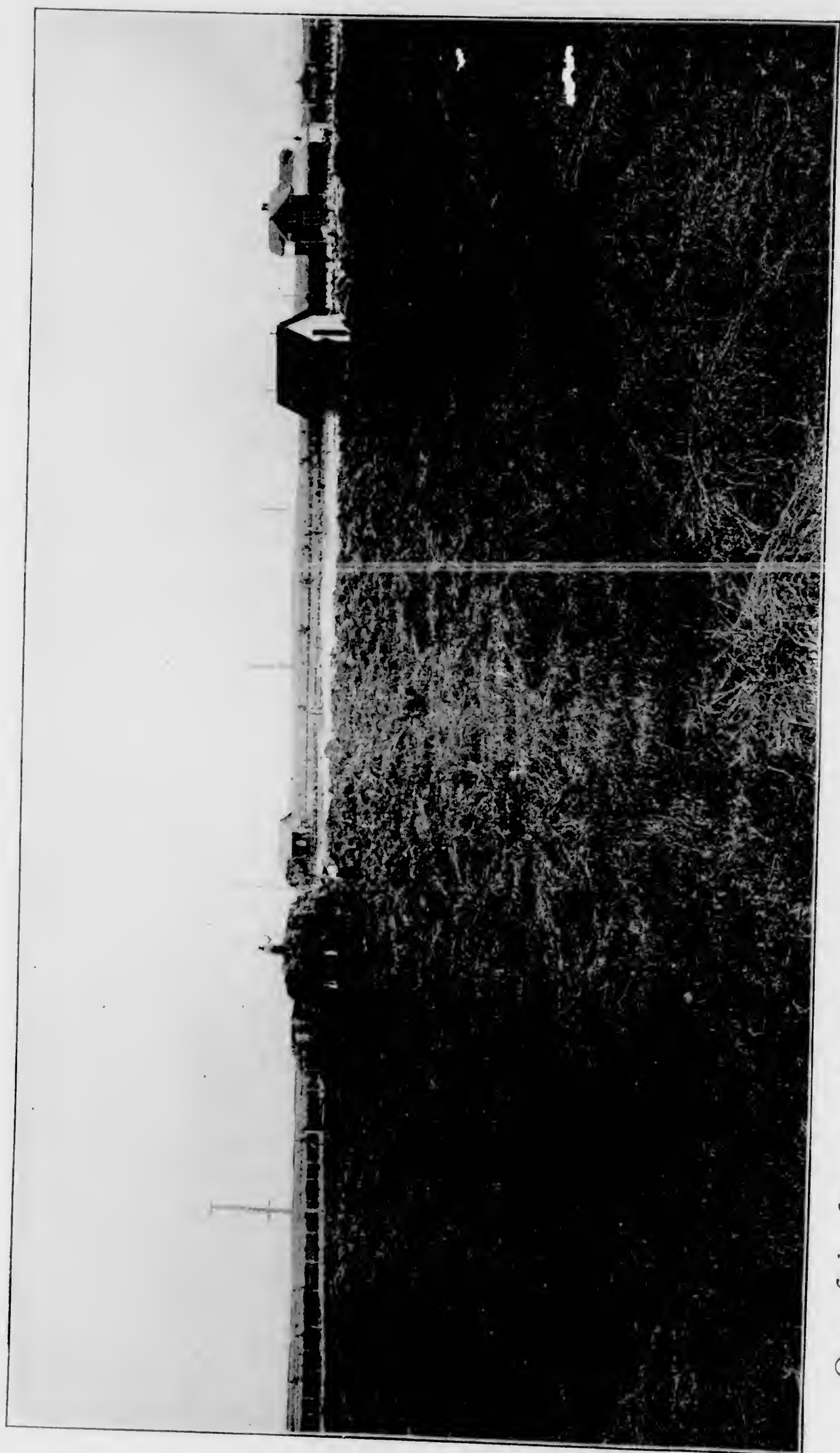
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One of the farms on the Twin Falls Tract in Southern Idaho which sold at \$300 per acre.

**Government  
interest in  
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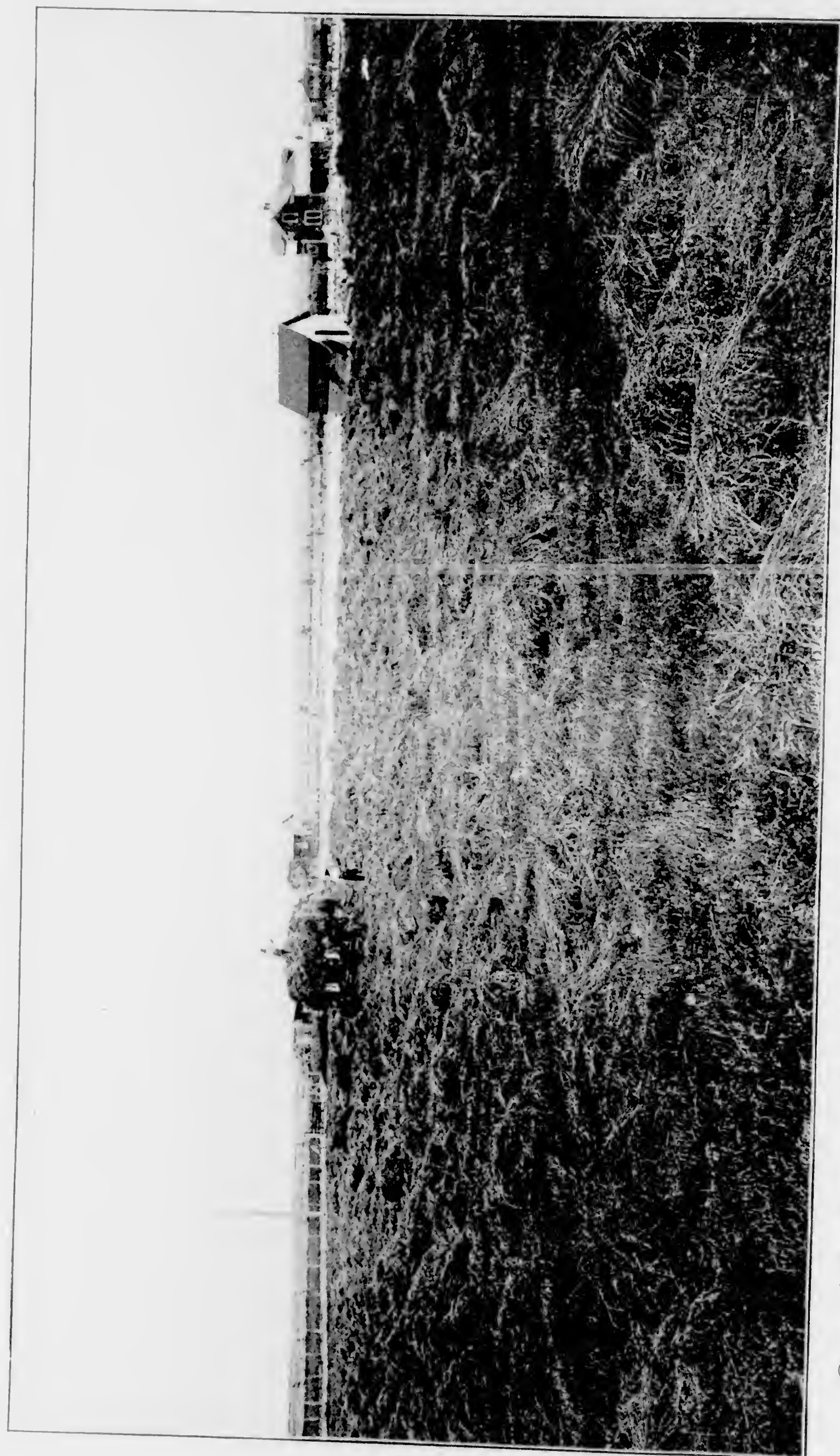
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**Values of Irrigated Land.**

It is well recognized that lands in completed irrigated districts rapidly enhance in values, as development proceeds. It is hard indeed to find improved land selling for less than \$50.00 per acre, and orchard land may bring as high as \$2,000 per acre, as it has in California. In Eastern Washington, in the lower Yakima Valley, improved land, suitable for small fruits, is selling at prices reaching \$1,000 per acre, and at Lewiston, Idaho, where cherries are very successfully grown, land has sold as high as \$1,500 per acre. On the recently developed Twin Falls Tract in Southern Idaho, agricultural land has brought as high as \$300 per acre, and in small tracts as high as \$600 per acre.

A step further will include the valuations of all the collateral development associated with the settlement of the desert—the steam railroads and electric lines, so essential for transportation, the telegraph and telephone system





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## THE HARNESSING OF THE MANY NATURAL WATER-POWERS.



Power House of the Great Shoshone and  
Twin Falls Water Power Company.



Salmon Falls of the Snake River.

industrial necessities with their demand for power, which will involve the harnessing of the many natural water powers to be found scattered through the arid regions. All these enterprises will require the employment of thousands of skilled and unskilled laborers, who, with their dependent families, will naturally add to the home market demand for the products of the irrigated farms.

And so the \$200,000,000 already referred to may be more properly said to represent a future addition of \$1,000,000,000 to the taxable property of the Nation.

### Some Govern- ment Reclamation Projects.

Among the more notable of the Government projects, which appear in the last report of the Reclamation Service, may be mentioned,

The Salt River Valley project near Phoenix, Arizona, with an irrigable area of 270,000 acres and involving the construction of the mammoth Roosevelt Dam, with a capacity of 1,300,000 acre feet, this being the largest dam in the world. The allotment from the Reclamation fund, for this project, amounts to \$4,539,161, half of which has already been expended;

The Yuma project in California, now well under construction, with an irrigable area of 92,000 acres;

The North Platte project of Nebraska-Wyoming, with the Pathfinder reservoir, having a capacity of 1,000,000 acre feet; \$3,300,000 has already been allotted to this project;

The Truckee-Carson project in Nevada, with the irrigable area of the first unit 200,000 acres, and for which \$3,700,000 has been allotted;

The Shoshone project in Big Horn County, Wyoming, with an irrigable area of 125,000 acres;

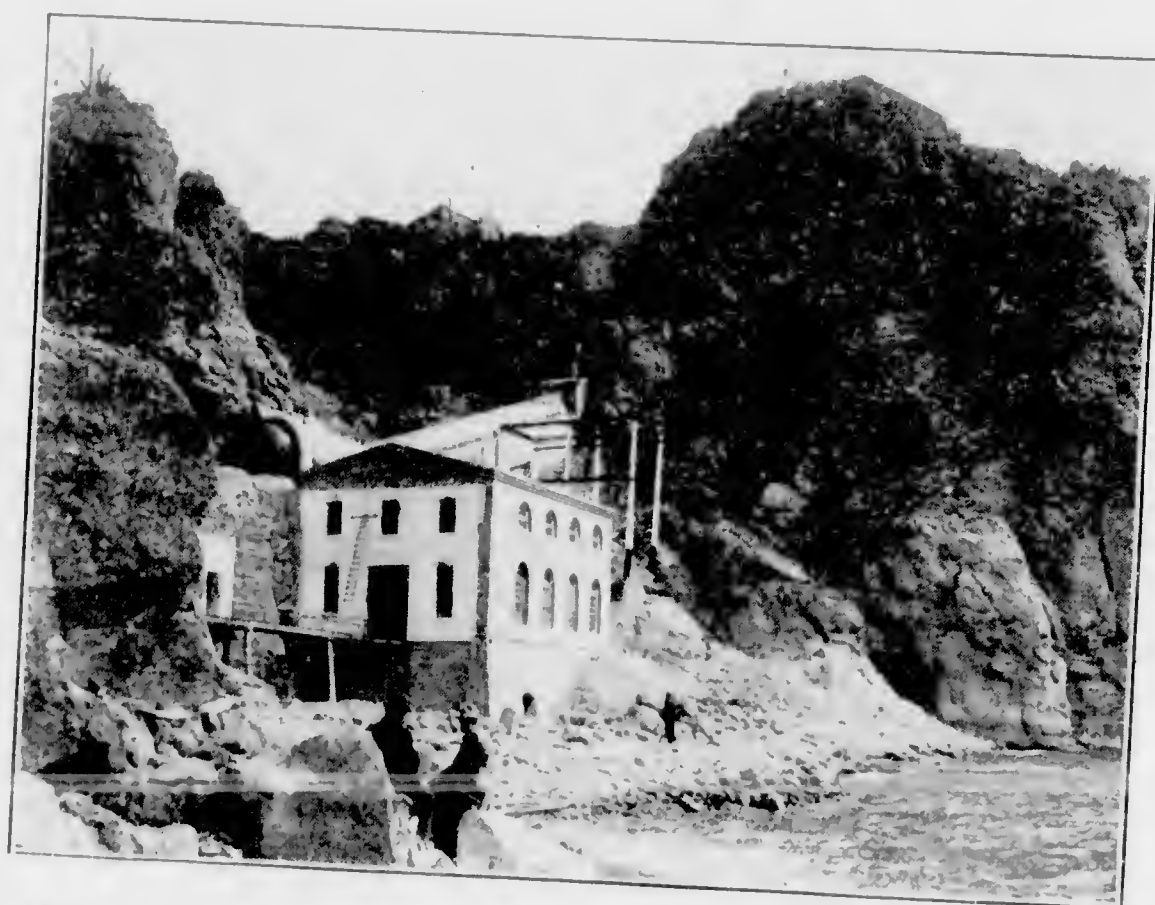
The Klamath project in Oregon to irrigate 236,000 acres;

The Payette-Boise project of Idaho, having an irrigable area of 372,000 acres, the first division of which is soon to be completed, and

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Power House of the Great Shoshone and  
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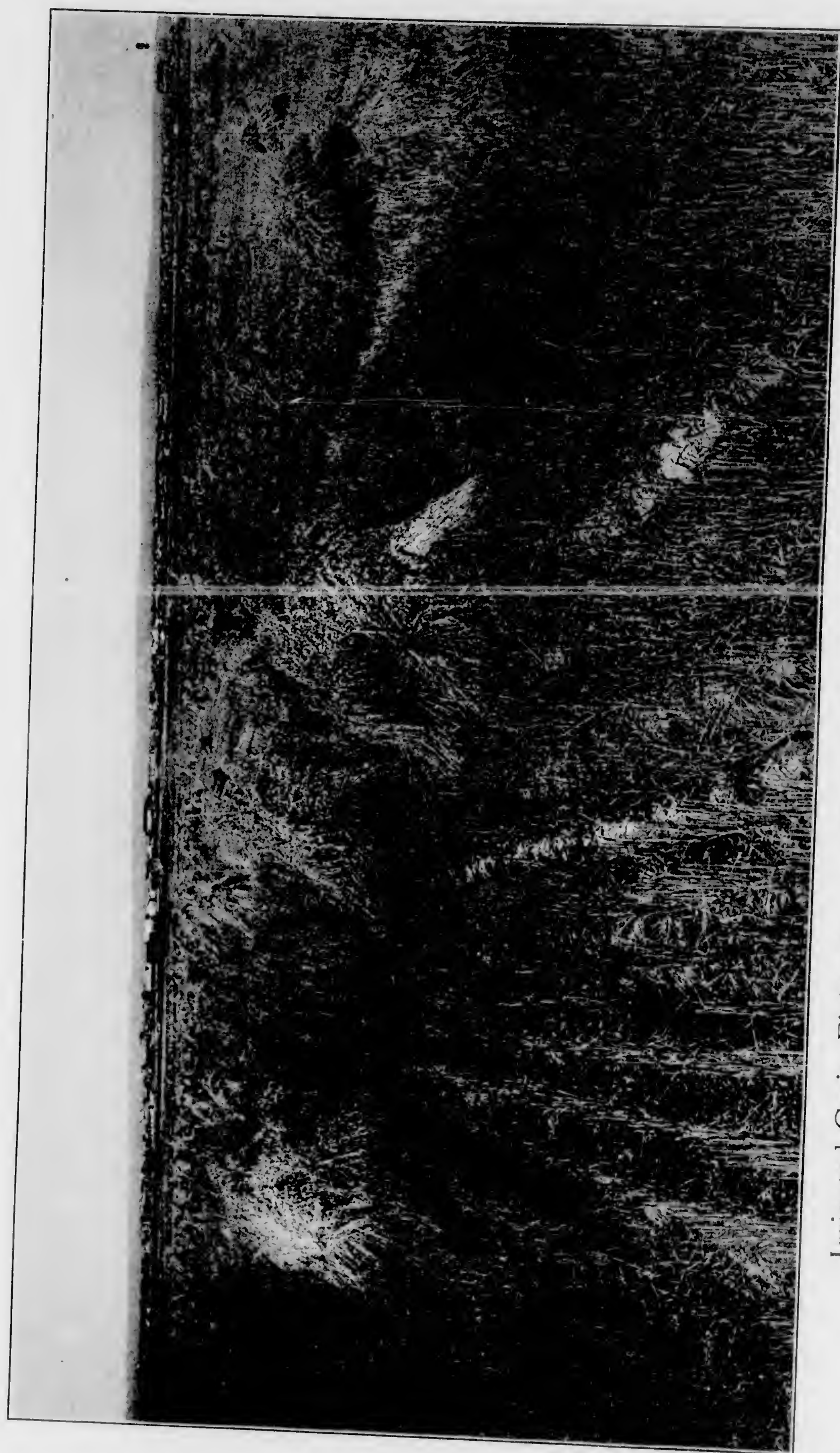
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Irrigated Grain Field, showing City of Twin Falls, Idaho, in the distance.

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These projects, though only part of the Government's present undertakings, will serve to give some idea of the scope of the Government's interest.

To sum up briefly, the Reclamation Service, which was organized the same month as the Panama Canal Commission, has dug 1,815 miles of canals, or nearly the distance from New York to Denver. Up to January, 1908, it has excavated 40,000,000 cubic yards of earth and rock, or one-third the total excavation required for the Panama Canal. It has erected 214 large structures, built 611 miles of wagon road in mountains and heretofore inaccessible regions, excavated 10 miles of tunnels and has surveyed and mapped an area larger than the combined area of Massachusetts and Rhode Island.

#### **Extent of Carey Act Projects.**

Under the provisions of the Carey Act over 2,000,000 acres have already been segregated, involving an expenditure of over \$20,000,000. Idaho alone has now exhausted her 1,000,000 acres donation, followed, however, closely by Wyoming, in which between 700,000 and 800,000 acres have been segregated, while Montana with 400,000 acres, Oregon, and Colorado are the only other states, where any considerable progress has been made.

#### **The Twin Falls Project.**

Among the private irrigation projects operating under the Carey Act, the Twin Falls development on the Snake River, in Southern Idaho, stands out conspicuously, as the largest and most successful irrigation project of any kind in the United States. In combination, the development of the south and north sides of the river, represents a segregation of 425,000 acres, over half of which acreage is already settled, and over three-fourths of which has already been sold.

As the Twin Falls project is so noteworthy, and as the Twin Falls North Side is practically a continuation of the project on the South Side of the Snake River, and is of especial interest to the reader of this booklet, the development will be treated in detail as an example of what may be accomplished by "Irrigation "





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“Where that writhing and winding river, aptly named the ‘Snake’, hisses through its canyon.”

## The Largest and Most Successful Irrigation Project in the United States—The Twin Falls Tract.

The year 1903 dawned in Southern Idaho, “Land of Sunshine”—where that writhing and winding river, aptly named the Snake, hisses through its canyon, walled with massive sides of rugged lava rock, to see stretched out for miles on either side, vast wastes of treeless desert plains, bristling with the bushy sage, and shunned by man and beast.

The year passed by, and then appeared the tented camps of a busy swarm, with transit and chain, or drill and shovel, preparing the way for the marvelous transformation scene so soon to follow. Then, too a house, or rather bungalow was built, and with it swaths of sage brush cleared—the nucleus of a future city—center of a thriving land.

In 1904 prospective settlers came from north, and south, and east, and west, and viewed the land, selecting here and there their future homes.

And now another year had passed, the spring of 1905 had come, when, at the Milner Dam, the mighty heart of all the region around, the gates shut down, the water rose and filled the dam, and then began to back, and then to spill. And soon were slowly opened other gates, and from them spurted streams, which, coursing through canal and ditch, two hundred miles of arteries and veins of that vast desert waste, brought vigor to the languid soil. And then it was that, with the water’s rush, extending out to all extremes, the pulse of that great sleeping tract began to beat, the stupor now forever gone. The sallow sage brush scale peeled off, and in its stead the green alfalfa grew, or maybe fields of wheat, or corn, or oats now pushing out their shooting blades, or later radiant with their golden grains. And everywhere sprang signs of life. The spell was off, and in the place of that long dormant waste, arose a strong and healthy fertile land.

Such then is the chronicle of events, transforming the largest single tract of desert waste, so far attempted, into farms, prolific with luxuriant crops and fruits.





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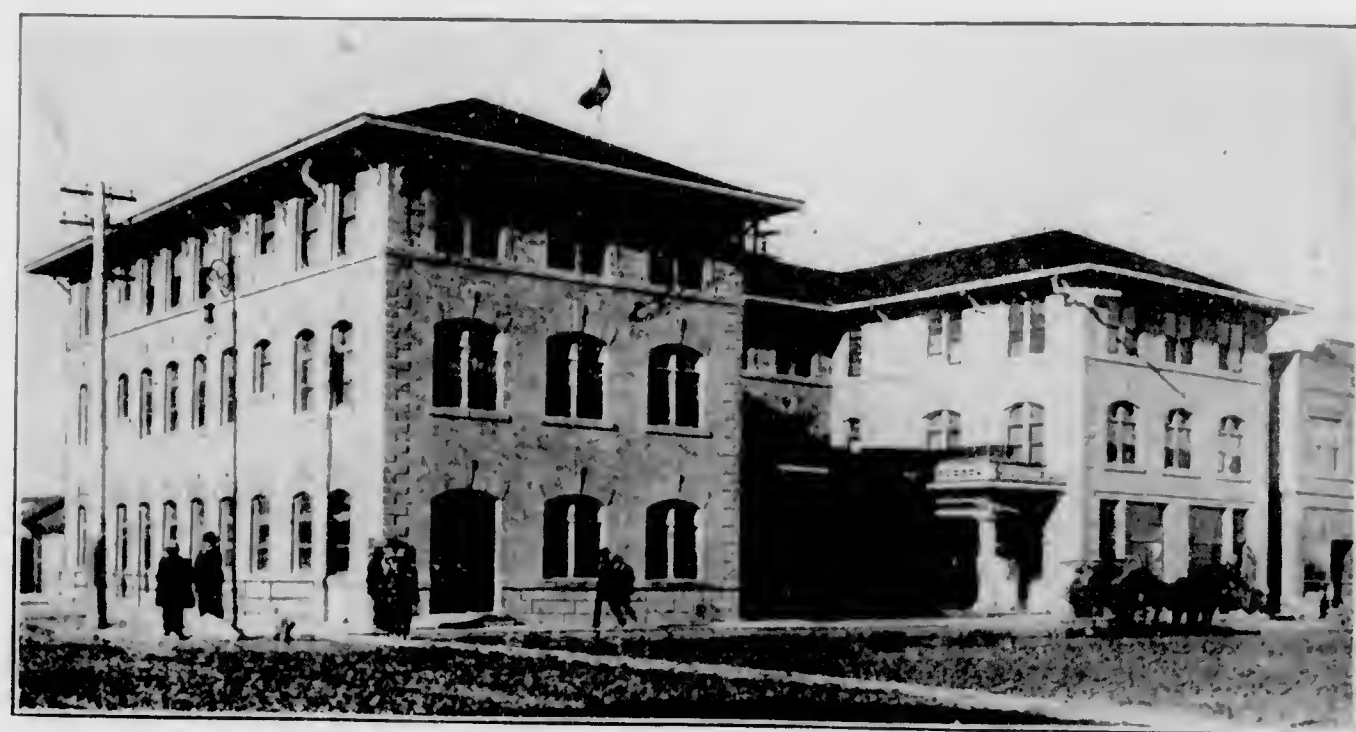
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The entire city of Twin Falls, Aug. 1, 1904, and Main Street, Twin Falls, 1907.



Hotel Perrine, Twin Falls.



The daily arrival of children from the Twin Falls tract at the Bickel School House.

Since then homes have dotted the landscape at frequent intervals all over the tract, to house the 2,500 settlers' families, and half a dozen substantial towns have been established, with populations of from 1,000 to 3,500. The County Cassia has been divided, and the town of Twin Falls is the county seat of the new Twin Falls County.

#### City of Twin Falls

All manner of modern conveniences attach to this town, including an excellent water supply, sewage and telephone systems, electric light and power. It boasts of several hotels, one of which, erected at a cost of \$100,000, is hard to find equalled in any other town of similar size. The school facilities are excellent, and in keeping with the liberal policy of the State of Idaho, jealously guarding the education of the young. There are three banks in Twin Falls, one national and two state, with deposits of over \$500,000. Town lots, 25 x 125, command from \$1,500 to \$7,000. Its mercantile houses do it credit, and manufactories are being rapidly established, with the recent acquisition of electric power, and as fast as the supply of labor can be depended upon.

Such a town then is this, three years old, substantial in all its elements, and yet with a growth only consistent with actual demands, far removed from pernicious speculative "boom."

Seventeen miles below Twin Falls, on the western edge of the tract, is the town of Buhl, at the present time terminus of the Minidoka & Southwestern Railroad, which runs through the tract, joining the Oregon Short Line at Minidoka, 75 miles above. This railroad was constructed at a cost of about \$1,000,000 simply to meet the demands of this tract, and it is said to be today the second best paying branch of the Oregon Short Line.

At Milner, 20 miles east of Twin Falls, a town of 1200 at the present writing, and where the great dam is located, the electric line now building from Gooding, on the Oregon Short Line to the southeast, will form a junction with the Minidoka & Southwestern. The development of this town is proceeding on industrial lines. Its close proximity to hydro-electric power, its railway connections, and its river navigation (for the Snake River is here navigable for





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Great Shoshone Falls.

some thirty miles or more) assisting in locating creameries, canning factories, sugar beet factories, flour and alfalfa mills, breweries, cement works, packing houses, etc.

**Water Power.**

The source of the power referred to is found in the several falls of the Snake River canyon, dividing the two tracts; these are the Great Shoshone Falls, with a drop of 210 feet—55 feet higher than Niagara Falls; Twin Falls, Auger Falls and Salmon Falls, indicating an aggregate possible power development of 150,000 H. P. A still greater transformation is in store for this district from the industrial development of these falls. Electric power is now being distributed on both the North and South side tracts, and the settler can enjoy electric light in his home, at a cost of about 1 cent per hour for a 16 C. P. light. Besides their utilization, these Falls are magnificent in their grandeur; visitors come to marvel from all countries of the world, giving this very district a world-wide reputation. Within the 60 miles of canyon, dividing the two tracts, the river's drop is 1500 feet.

**Richness of Soil.**

But the main factor in all this development, the reasons for its primary undertaking, its present prosperity, and its bright perspective, is not to be found in the grandeur of its scenery, nor in the conveniences of the towns, nor in the railroad facilities, nor even in the great power advantages; the secret is in the extraordinary richness of the deep lava loam, fertilized by the water conveyed to it by the net work of canals and ditches, extending over hundreds of miles, and the perfect climate, assisting this fertilization in the furtherance of the growth of crops.

**Climate.**

Southern Idaho has been termed the "Land of Sunshine," and so it is, for with an average annual rainfall of only about 12 inches, but 3 to 5 inches of which are in the growing season, 300 clear days may be counted on throughout the year; thus affording crops a wonderful amount of sunlight, and spoiling no harvests by rain. The temperature is mild, and sensibility to extremes is lessened by the dry atmosphere. The thermometer seldom touches zero in the winter,





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Idaho  
Showing course of the Snake River.

nor rises above 100 degrees in the summer. Cyclones, hot winds and devastating storms are unknown in this land.

The soil is a "rich volcanic ash, with slight admixture of sand, which renders it more easily irrigated than the heavier clay soils." It extends to great depths, and, bedded with lava rock, will retain its moisture a long time.

**Drainage.** The land of the North Side tract has somewhat of an advantage over that of the South Side, in that it gradually slopes towards the south, affording excellent drainage, and an ideal exposure for orchards and growing crops. A strata of excellent water is also found from 200 to 300 feet under the North Side tract, enabling the settlers at all times to secure, by wells, the purest water for their homes.

**Scientific Farming.** The combination of climate, soil and moisture on the Twin Falls tracts has produced results in the production of crops, truly marvelous and calculated to tax credulity. These marvelous results, however, are made ordinary on these tracts due to another element injected into the attending conditions, and which ably supplements the advantages of climate and soil. It is that of "scientific farming."

Mr. Edward T. Barber, editor of the "Shoshone (Idaho) Journal" has written an article on irrigation farming which affords some points of interest:

"The farmer in the rain belt hears of the phenomenal crops of the irrigation farmer, and pronounces the stories fakes of the rankest kind. Occasionally he gets an opportunity to actually behold some of the wonderful returns of the irrigation farmer and then he is filled with wonder and instinctively asks "why?" \* \* \* \* Soil supplies the necessary chemical elements for plant life, sunshine supplies the mysterious power by which these elements are brought in place in the plant, and water is the vehicle which dissolves the chemicals and conveys them to the organs of the plant. The irrigation farmer, by controlling his water supply, is master of the three elements under consideration. He can control them with as certain results, as can the master of a factory or a machine shopman his materials, into a finished product. In other words the irrigation farmer is a manufacturer of farm products.

In the rain belt every rain which falls, dissolves and carries away with its excess run-off water the chemical elements in the soil so necessary to





Plums on Twin Falls tract.



Apple Tree on Twin Falls tract.

plant life. \* \* \* In a desert country no such leaching of the soil can take place. The soil of the desert retains all of its original chemical elements necessary to plant life. \* \* \* Another condition which frequently injures the crop of the rain belt farmer, and which the irrigation farmer does not have to meet, is the damage to a growing crop from a hard rain, coming just at the time the plant is in the critical stage of blossom, so as to wash off the pollen and blast the seed pods to a certain extent.

"The very conditions which are necessary to bring rain to the rain belt farmer, of necessity shuts off his sunshine. In Idaho the number of sunshiny days during the growing season is perhaps greater than in any other farming community on earth. Its high latitude brings some sixteen hours of sunshine each day during the height of the growing season, and a cloudy day is a rare occurrence at that time of the year. The peculiar location of Southern Idaho in relation to the mountains, and the warm currents of the Pacific, give her an added advantage in the matter of warm atmosphere to her long days of sunshine.

"The key to the great advantage of irrigation farming over rain belt farming lies in the power to regulate the quantity of water applied and the application of it to a growing crop at the right time. The rain belt farmer is at the mercy of the chance rain for the application of water to his crops. \* \* \* Give a crop of oats all the water it will use in its early stages of growth and it fairly runs riot in its wealth of straw. It grows, entirely unmindful of its duty to its kind, in the matter of self perpetuation by raising a seed head. Give it all the soil, sunshine and water it can use, and it will produce little but straw. The irrigation farmer permits his oat crop to expend its energies in producing straw, to a certain point; he then shuts off the supply of water, and the plant's instinct warns it to begin to throw out a seed head. When the head is fairly started the irrigation farmer then feeds the plant again, and stimulates the energies of the plant in that direction to its utmost capacity. \* \* The same principal applies to all other crops the same as oats. \* \* \* "

The new settler on the Twin Falls tracts is assisted in learning the best methods of irrigating, and in producing satisfactory crops, through the establishment of an experimental farm, maintained under an experienced superintendent, Mr. Alexander McPherson, for fourteen years State Horticulturalist of Idaho. Lectures on agriculture, horticulture, dairying, etc., are given somewhere on the tracts nearly every night in the week. Experiences are exchanged and discussions engaged in, which are resulting in the adoption of farming methods all over the tracts calculated to produce the best results from the soil.

Some yields. Following is a letter from Mr. McPherson, dated January 25th. 1907, quoted in part as follows:





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"The Reference to Winter Apples is Worthy of Note."  
One limb of an apple tree on the Twin Falls tract.

"The past two years has amply demonstrated that practically all crops grown in the temperate zone can be raised successfully on the Twin Falls tract, and I believe that for many varieties, there is no section in the northwest where the crop production can be equalled. To illustrate this—last year some of our wheats produced as high as 84.5 bushels per acre, oats 119 bushels per acre, barley 84 bushels per acre, corn 94 bushels per acre, potatoes 524 bushels per acre and sugar beets 22 tons per acre, giving 19.7 per cent. sugar on raw land, while melons, including the Rocky Ford Canteloupe, were the most productive crop that I ever saw.

Alfalfa went as high as nine tons to the acre the second year, while in a number of instances in large tracts, the average was seven tons to the acre the first year's crop. All kinds of garden vegetables, including celery, were the finest I ever saw.

The orchards that have been set out are making a very fine showing and wondrous growth. Some of these orchards, from actual measurement, grew ten to fifteen branches from four to six feet in length. I believe that all kinds of fruit will be grown successfully on the tract, and especially do I think that this will be a country for raising winter apples."

The reference to winter apples is worthy of note, inasmuch as carload after carload of most delicious apples were shipped this year to Chicago and the East.

"Besides the cereals, grasses and vegetables already enumerated  
**Other** others may be mentioned as having done exceedingly well here:  
**Crops.** Rye, buckwheat, clover, timothy, red-top, orchard grass, hops, peaches, pears, prunes, plums, nectarines, apricots, Japanese plums, quinces, cherries, grapes, currants and all small fruits. Strawberries are extremely prolific, and their season lasts from the middle of May to the middle of November. Peanuts, sweet potatoes and tobacco have also grown splendidly. It would be difficult to find a place adapted to a wider range of profitable crops. Wherever the Idaho "Italian" prune has come into competition with the same prune of any other section, the Idaho product has brought from \$250.00 to \$300.00 per car *more* than any other competitor.

"One of the demands of the Rocky Mountain States is poultry  
**Other** and eggs. There never has been enough of either Bee-keeping  
**Products.** is profitably carried on in the older districts. Alfalfa yields a delicious white honey, for which there is an abundant market. Hogs give immense profits where the grower raises them on alfalfa. Milk and butter are in constant demand. Butter in great quantities is continually being brought from other states to supply the cities, towns and mining camps of the Northwest."

On the Twin Falls North Side tract, along the bank of Snake river, is the famous Blue Lakes  
**A World Famous Fruit farm.** Fruit Farm—the pioneer farm of the district. It was here that Ira B. Perrine years ago drove his herds of sheep, for shelter in the canyon. Impressed with its beauty and natural advantages, he quickly





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"The past two years has amply demonstrated that practically all crops grown in the temperate zone can be raised successfully on the Twin Falls tract, and I believe that for many varieties, there is no section in the northwest where the crop production can be equalled. To illustrate this—last year some of our wheats produced as high as 84.5 bushels per acre, oats 119 bushels per acre, barley 84 bushels per acre, corn 94 bushels per acre, potatoes 524 bushels per acre and sugar beets 22 tons per acre, giving 19.7 per cent. sugar on raw land, while melons, including the Rocky Ford Canteloupe, were the most productive crop that I ever saw.

Alfalfa went as high as nine tons to the acre the second year, while in a number of instances in large tracts, the average was seven tons to the acre the first year's crop. All kinds of garden vegetables, including celery, were the finest I ever saw.

The orchards that have been set out are making a very fine showing and wondrous growth. Some of these orchards, from actual measurement, grew ten to fifteen branches from four to six feet in length. I believe that all kinds of fruit will be grown successfully on the tract, and especially do I think that this will be a country for raising winter apples."

The reference to winter apples is worthy of note, inasmuch as carload after carload of most delicious apples were shipped this year to Chicago and the East.

"Besides the cereals, grasses and vegetables already enumerated  
**Other** others may be mentioned as having done exceedingly well here:  
**Crops.** Rye, buckwheat, clover, timothy, red-top, orchard grass, hops, peaches, pears, prunes, plums, nectarines, apricots, Japanese plums, quinces, cherries, grapes, currants and all small fruits. Strawberries are extremely prolific, and their season lasts from the middle of May to the middle of November. Peanuts, sweet potatoes and tobacco have also grown splendidly. It would be difficult to find a place adapted to a wider range of profitable crops. Wherever the Idaho "Italian" prune has come into competition with the same prune of any other section, the Idaho product has brought from \$250.00 to \$300.00 per car *more* than any other competitor.

"One of the demands of the Rocky Mountain States is poultry  
**Other** and eggs. There never has been enough of either. Bee-keeping  
**Products.** is profitably carried on in the older districts. Alfalfa yields a delicious white honey, for which there is an abundant market. Hogs give immense profits where the grower raises them on alfalfa. Milk and butter are in constant demand. Butter in great quantities is continually being brought from other states to supply the cities, towns and mining camps of the Northwest."

On the Twin Falls North Side tract, along the bank of Snake river, is the famous Blue Lakes  
**A World Famous Fruit farm.** Fruit Farm—the pioneer farm of the district. It was here that Ira B. Perrine years ago drove his herds of sheep, for shelter in the canyon. Impressed with its beauty and natural advantages, he quickly





"In Idaho are quartered 4,000,000 sheep."



Thousand Springs on the north side of the Snake River.

decided to make the canyon his permanent home, planting his first fruit orchard and his forage farm, which he watered by means of ditches of his own construction, leading from the two lakes, whose bluish cast have given them their name.

This farm has in the neighborhood of twenty thousand bearing fruit trees of almost every kind, and it was the fruit from this noted farm that won the first prize and Gold Medal at the Trans-Mississippi Congress, Buffalo Exposition, World's Fair at Chicago, Lewis & Clark Exposition, and World's Fair at Paris, for the best fruit exhibit.

In this orchard are produced almonds and walnuts. English walnut trees are flourishing, but are yet too young to have produced. In the plum line every species is found here, even to semi-tropical fruit.

The question may be raised, if this country produces so marvelously, will the available market be sufficient to keep farming so profitable? In answer to this, let it be known that in Idaho are quartered 4,000,000 sheep, besides great quantities of cattle. In Cassia County alone over 100,000 cattle are quartered on the ranches there. To supply winter forage for the present demand, is more than the farmers of the Twin Falls tracts are doing now, and as the cattle industry increases on the tract, even more provender will be required.

**Local Market.** Within the current year the population of the combined tracts will be close to 20,000 people, and as the sub-division of lands has already begun, the colonizers coming in with purchases of five or ten acre lots—laborers and mechanics for the various industries—there will be a liberal and continually growing local market to provide for. The Pacific coast is also close by, which furnishes, besides the market of the seaboard cities, an export market as well.

The many mining camps are all great consumers of the products of the Twin Falls tract, and may be included in the local market.

The demand for sugar beets by the factories locating on the tract is not likely to ever become oversupplied, for the sugar





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beet is a staple and will always be in great demand, and hops, by reason of their excellent quality, are shipped in quantities as far east as New York.

**Fruit Market** The fruit market is found largely in the states East of the Mississippi River, which have in recent years become great consumers of the Northwestern fruits.

It may not be known that two-thirds of the Northwestern fruits found in the New York market come from Idaho, and Idaho fruits, as well, bring the best prices by reason of their quality. The market for canned fruits is also an extended one, being both domestic and export. In fact the question of market for products is not one to give any anxiety to the settlers on the Twin Falls tracts.

With the great resources of this irrigation tract as yet only partially developed, and with the knowledge of what has been already accomplished, the future of this district within the next decade baffles prediction.

**Extraordinary Sales of Land.** The success of the North Side project bids fair to outstrip that of the South Side, so that their consideration may properly be that of one tract. The sales of land at Jerome, on the

North Side amounted to nearly 50,000 acres in one day, all in blocks of from 40 to 160 acres, distancing anything of the kind ever known. Within a few weeks, more than half the entire acreage had been disposed of, to settlers anxious to develop the new tract.

**Water Supply.** There is abundant water for the proper irrigation of the Twin Falls tracts at all seasons of the year, however dry that season may be. The total appropriation of water rights accruing to the Twin Falls North Side Land and Water Company is 5,650 second feet, the contract with the State requiring the company, however, to provide a carrying capacity of but 1,800 second feet, as being an ample supply for the proper irrigation of the entire 180,000 acres. The Company's agreement with the settlers, based on the State's contract, allows each settler 1-80 of a second foot per acre continuous flow, which is equivalent to a monthly rainfall of 9 inches.





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Construction work on Twin Falls North Side Canal.

#### **The Dam at Milner.**

The Milner Dam diverting the water from the Snake River, twenty-three miles above the Great Shoshone Falls at the head of the famous Snake River Canyon, is declared by engineers to be one of the finest pieces of construction of its kind in the world. Its cost was half a million dollars, and it was built with most exacting specifications for permanency. Upon the initial development of the North Side of the Snake River, by the Twin Falls North Side Land & Water Company, title to an undivided interest in this dam passed to the latter company under the sanction of the State. Of concrete, earth and rock construction, it raises the level of the river 49 feet and backing the water 14 miles, forms in itself a large reservoir. "The gates extend 530 feet along the crest of the dam, whose total length is 2000 feet. Incorporated in the dam are two islands of rocks; on the south island are located the gates and on the north island is a permanent concrete waste weir, which takes care of the excess flow of the great river. Beneath the north island is a tunnel 50 feet wide and 10 feet high, divided into eight compartments, all lined with cement. The two islands, which disputed the river's path divided the stream into three channels, each of which has been stopped by a substantial dam. The rock portion of the dam is 160 feet wide at the base, 80 feet high and 20 feet across. The upstream side is filled with puddled earth sluiced in. The base is 450 feet with a margin of safety  $6\frac{1}{2}$  to 1. No irrigation tract is more secure in the supply of water."

#### **Features of Irrigation System.**

In addition to the storage capacity of the Milner Dam, the North Side tract is guarded through provision for three reservoirs to supplement the supply at any time, or to provide for any possible contingency. The aggregate capacity provided for by these three reservoirs is 200,000 acre feet; an exceptional liberal reserve supply. A participation in the huge government dam at Jackson's Lake in the Teton Mountains at the headwaters of the Snake River has also been acquired, an evidence of the liberal precautions taken to insure ample water supply at all times. The canals are constructed of rock, earth and con-





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#### Towns of the Northside.

The towns of Milner, Jerome, and Wendell are fast building, and will doubtless hold prominent positions, not only in the Commonwealth, but throughout the entire Northwest.

With such wide interest in the subject of irrigation, much has been written recently for publication in current magazines. The Twin Falls tract being conspicuously the most successful of private irrigation projects has been frequently mentioned in the articles referred to, and more elaborate descriptions have been given than is herein attempted. Its fame has attracted numerous visitors of prominence, and it may be interesting to quote from the impressions of a few of them as follows:

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In the summer of 1907 William Jennings Bryan said in a speech: “No one who has visited the irrigated regions can understand the transformation that water makes in the appearance of a desert. But even those accustomed to the miracle, that has been wrought by the irrigation canals, is hardly prepared for the change that has taken place within three years in the land about Twin Falls. We visited Jerome, the new town on the North Side Twin Falls project, in order that we might compare it with the development which we expect to see when we return a few years hence. With your climate, your soil, and the abundant water of your great river, you are destined to be one of the most famous, if not the most famous of the irrigated sections of the country.”

The Congressional Committee on Irrigation and Reclamation made a tour of the arid states and visited the Twin Falls Tract. In reporting this visit the Twin Falls News says: “The Twin Falls Irrigation project is by far the grandest private enterprise of the kind we have ever seen since we began our journey through the arid regions of the west, and we have seen





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"All you need is a Pennsylvania Dutchman to farm your lands," declared Congressman A. F. Cooper of Pennsylvania. "We have seen many projects on our journey, but none of them suits me like this one. The soil, the climate and the water supply are first class, and your citizens are evidently people of brains and capital. I am not authority on irrigation, but I do not need to be, to appreciate your magnificent project; a schoolboy could do that."

Congressman Reeder of Kansas, could speak with authority, being familiar with irrigation for years. "As an old irrigator," he said "it was easy for me to become enthusiastic over the Twin Falls project. It is an enterprise I want to remember. Your water supply is secure and ample; your land is fertile and easy to irrigate; and your climate is such that people may live here in comfort the year around."

Such corroborative evidence may be heard from all who visit this tract. They come with doubting minds, they see, they hear, and with conviction of the miracle, they turn away again with keen regret that word and pen so utterly fail to describe this truly greatest wonder of the age.



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Typical Farm Houses



on the Twin Falls tract.



## Opportunities for Investment Afforded by "Irrigation."

### The Carey Act responsible for investment possibilities of Irrigation Securities.

While Irrigation bonds have had a place in the investment market for many years, being principally the issues of "municipal irrigation districts," or those of corporations organized to supply water to land owners at a stipulated rental for irrigating purposes, not until the passage of the Federal Carey Act in 1894, and its vitally important amendment in 1897, was there any special protection afforded the investor in irrigation securities of private undertakings, beyond that which might obtain in each individual case on its own merits.

Investors until then, therefore, naturally held aloof from a class of securities, which placed the layman at such a disadvantage in determining the relative security afforded by each offering. And properly so, for certain essential features might be lacking which would render the project unsuccessful, causing the bondholders to foreclose on a property which might prove of little merit.

### Elements of Success are Guaranteed.

It was, therefore, for this reason that the United States Government evolved a plan for the encouragement of capital investment in irrigation securities, resulting in the passage of the "Carey Act."

*Reclamation projects operating under its provisions are guaranteed liberal safeguards to the investor:—*

- (1) A sufficient water supply, and its proper distribution over the tract to be irrigated
- (2) A climate and soil suitable for agricultural pursuits.
- (3) Stability and completion of the irrigation works, which must be constructed under the supervision of the State, and whose completion is guaranteed by a substantial bond.
- (4) A statement of the estimated cost of the works, and the margin of profit contemplated in the sale of the water rights, the maximum price of which to settlers is fixed.





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(5) Perfect titles to the land, direct from the Government and the State.

(6) Eventual proprietorship of the irrigation system by the land owners—each water right purchased representing a share in the Irrigation Company.

(7) A first and prior lien created by the State, on all the segregated land in favor of the irrigation company.

(8) A settled community of improved and developed farms of 160 acres or less, each.

*All the elements necessary for success are thus assured to "Carey Act" irrigation projects.*

This has been made possible by the earnest endeavor of the United States Government, to encourage its citizens to assist in reclaiming the arid lands, by affording them security for the return of their capital, together with proper compensation for its use.

**Carey Act projects of relative worth**

There are, of course, features which render "Carey Act" projects more or less desirable. These are those which bear on the attractiveness of the irrigated district to prospective settlers, and which contribute to a reasonably quick sale of the land and water rights, through which the irrigation company is reimbursed for its investment, and secures its profits. Among these collateral features are the relative productiveness of the soil, advantages of climate, the market for products, the transportation facilities afforded, the character of settlers, the educational opportunities, and the cost of fuel and power.

**Special security afforded through "Carey Act" features.**

In addition to the obligation of the irrigation company and the security afforded, by the mortgaging of its works, (including dams, reservoirs and canals, and its right to distribute water and sell its shares), the bonds of "Carey Act" projects are further protected through a first and prior lien, on the entire segregated tract, created by the state, in favor of the Company. This lien provides that the lands of projects under this Act may be sold to settlers by the state, only after the settlers shall have

purchased a corresponding amount of water rights, or shares in the Irrigation Company, at a price representing a proportionate cost of the works, together with the profit permitted by the State.

To facilitate the colonization of the land, the water rights are usually sold on terms of a definite payment down, and the balance in annual installments. A still further security is thus made possible as the basis for a bond issue by the Irrigation company, in that the purchase money mortgages, given to the company by the settler to secure the deferred payments, may be pledged with a trustee, giving the bondholders the *additional security of first mortgages on individual farm lands*. As the installment payments are made on these purchase money mortgages, the equity in the mortgages correspondingly increases. Moreover, the value of the land securing the mortgages invariably increases with the development of the district, so that where the original mortgage represents say 80 per cent of the first cost of the undeveloped land, after, say, four or five installment payments have been made, the mortgage lien represents perhaps only one-half of the original cost, and may be only five or ten per cent. of the then actual market value of the land securing the mortgage. This feature of increasing security, renders the long maturities of the serial bond issue, especially desirable from an investor's standpoint.

**Perfect titles assured.**

With perfect titles afforded through patents from the state, and with the validity of the mortgages unquestionable, (since the original lien is created by the state under authorization of the United States Government), the only element open for consideration, in establishing the security presented, is the sufficiency of the margin of equity, and the stability of land values.

**Land Values.**

A recent report of the Reclamation Service gives the average value of lands reclaimed by the Government as \$47.00 per acre. The terms upon which Government project lands are sold to settlers are much less attractive than those of the lands sold under Carey Act projects. It stands to reason, therefore, that the average value of the latter lands should considerably exceed this figure. As a matter



of fact they do, and it is a rare instance where any improved land, in any irrigated district, can be purchased for as little as \$50.00 an acre anywhere. On a newly irrigated district the lands bring from \$75.00 to \$300.00 an acre, and as development proceeds, the values enhance, until \$300.00 no longer seems a high price for good agricultural land. Orchard land is in demand at much higher figures, it frequently changing hands at as high as \$2,000 per acre. The reason for this is due to the prolific soil of irrigated land, the absence of crop failures, the abundance of sunshine and the regulated moisture making scientific farming possible, and assuring future crops, many times in excess of those grown in the humid regions. A farmer may dispose of his eastern farm at a price for which he can purchase three times the acreage on a district about to be irrigated, and upon it, when the water is "turned on," produce crops three or four times in amount per acre those produced by his former farm. In this way he not only doubles or trebles his income, but increases it maybe eight or ten times over.

#### **Increasing demand for Irrigated Land.**

The magazines and newspapers of the country are active in extending a wider interest in irrigated lands, and the wide awake farmer of the East and Central West is becoming alive to the vast opportunities presented, and is settling upon the new lands, leaving his worn-out farm for his less progressive neighbor. At a recent opening of a tract in Idaho by the Twin Falls North Side Land & Water Company, over 48,000 acres of land were sold in one day, to nearly 1900 settlers, representing forty of the states of the Union.

The demand today for irrigated land is greater than the supply. Thousands of United States citizens have been aroused to settle the irrigated districts in the Canadian-Alberta Province, owing to the limited area of irrigated land in this country. It seems that, as fast as an irrigated tract is opened for settlement, the land is quickly occupied. Little doubt, therefore, can exist regarding not only the stability of present values of irrigated lands, but of the certain increase in values, as the demand for the lands grows, with the increasing appreciation of their real worth.

With this question disposed of, the bonds of irrigation companies, which operate under the provisions of the "Carey Act," and which pledge the individual settlers' purchase money mortgages with a reasonable margin of equity attaching, present, as a class, an opportunity for an exceedingly safe and conservative investment. In addition to the fact that they are secured by individual farm mortgages, their issue is of a necessity based on cost values, and is not susceptible to valuations fictitious or "watered." With crops insured against failure from drought or flood, with strikes and lockouts, conflagration and financial panic, no factor to the irrigation farmer's success, prompt payments may be with the utmost certainty depended upon.

#### **Relative position of investments.**

In the relative security value of the several classes of investments, first place is conceded to Government bonds, and those bonds which have been legally issued by substantial municipalities. Such securities are based on the sovereignty of the State, and the prior claims of taxation.

Second only to these are first mortgage bonds secured by real estate. Their relative value is determined by the sufficiency of the margin of equity, the marketability and stability of values of the property mortgaged, and the responsibility of the mortgagor. There is further entailed upon the investor however, scrutiny of property titles and position of the lien. In this class may be properly included irrigation bonds of companies which operate under the "Carey Act," and which pledge as additional security the purchase money mortgages received from settlers.

#### **Advantages over Mortgages.**

Such bonds have distinct points of advantage for investment purposes over many local mortgages: (1) The sufficiency of the margin of equity is usually ample, even based upon values of the land in an undeveloped state, and these values, as has been shown, invariably increase greatly with development. There is no danger then of basing the margin of equity on a high valuation, which is likely to decrease, wiping out the margin, as is not infrequently the case in mortgages on city property, even in the most substantial cities. The price of irrigated farm



and orchard land is on the increase, the price of farm land in the East seems to have passed its maximum.

(2) The demand for the irrigated lands of "Carey Act" projects is such as to guarantee an assured market for the properties under mortgage, practically eliminating all possibility for the necessity of "buying in" the property under foreclosure, for self protection.

(3) The question of title is eliminated, inasmuch as the title to the irrigated lands under mortgage is received through patent from the state.

(4) The position of the priority of the mortgage is absolute by Federal and State enactment, there being created a first and prior lien "which said lien is in all respects prior to any and all other liens created, or attempted to be created by the owner or possessor of the lands."

(5) The responsibility of the mortgagor is a question passed upon by the Secretary of the Interior, as well as by the State Board of Land Commissioners, before granting the application, and is further assured by the filing of a substantial bond with the state.

(6) The convertibility of irrigation bonds is usually much more readily effected, than in the case of any individual mortgage, on either farm or city property.

**Certain Irrigation  
bonds rank  
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Government and  
Municipal bonds.**

Granting that the above statements cannot be successfully disputed, the bonds of "Carey Act" irrigation projects, which pledge the settlers' mortgages as additional security, take rank as a class, in point of security next to Government and municipal bonds.

As the security now afforded the investor in irrigation bonds becomes more fully appreciated, and more widely known, it is certain that irrigation bonds will within the near future sell at relatively much higher prices. Especially is this so in view of the recent financial disturbances, which have warned the careful investor, to seek investments remotely removed from the influences of speculation, and direct dependence upon industrial development.

### **Farm Products Always in Demand.**

Farm lands are the basis of security for the irrigation bonds now under consideration, and farm lands supply a necessity at all periods, whether of prosperity or depression. The 80,000,000 people in this land must depend on the products of the soil for food, and other nations, as well, must look to this country to supplement their food and provender supplies. Mr. J. J. Hill, the well known railroad pioneer and developer of the Northwest, is quoted in a recent speech as saying "The greatest resourcefulness of this country lies not in her iron and steel, nor in her gold and silver, but in the fertility of her soil, and its development in agricultural pursuits."

President Roosevelt in his message to Congress of December, 1907, says "Irrigation should be far more extensively developed than at present\*\*\*\*\* The work of the Reclamation Service in developing the larger opportunities of the Western half of our country by irrigation *is more important than almost any other movement.*"

### **Opportunity for investor to participate.**

With the Government active in the performance of its share, in adding to the general prosperity, through the reclamation of the arid lands, encouraging capital by the enactment of protective laws, and donating millions of acres of its lands, and with prospective settlers only awaiting the call, it remains for the capitalist and the investor to avail themselves of the invitation to assist in the great work, by familiarizing themselves with the subject, and by lending their money in this cause, where they are certain not only to receive it back again, but to be liberally compensated for its use.





REPUBLIC BANK NOTE COMPANY  
PITTSBURGH, PA.



**End of  
Title**